Engineering News-Record

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Grading and Lining Machines for Canal Construction

Anchoring a Shaky Dam With Steel Cables

Moving-Grate Garbage Incinerator at Spokane

Reducing Secondary Stresses in High Trussed Bents

* * *

Old Man River gets a new channel—hydraulic dredge at work on one of the Mississippi cut-offs below Arkansas City

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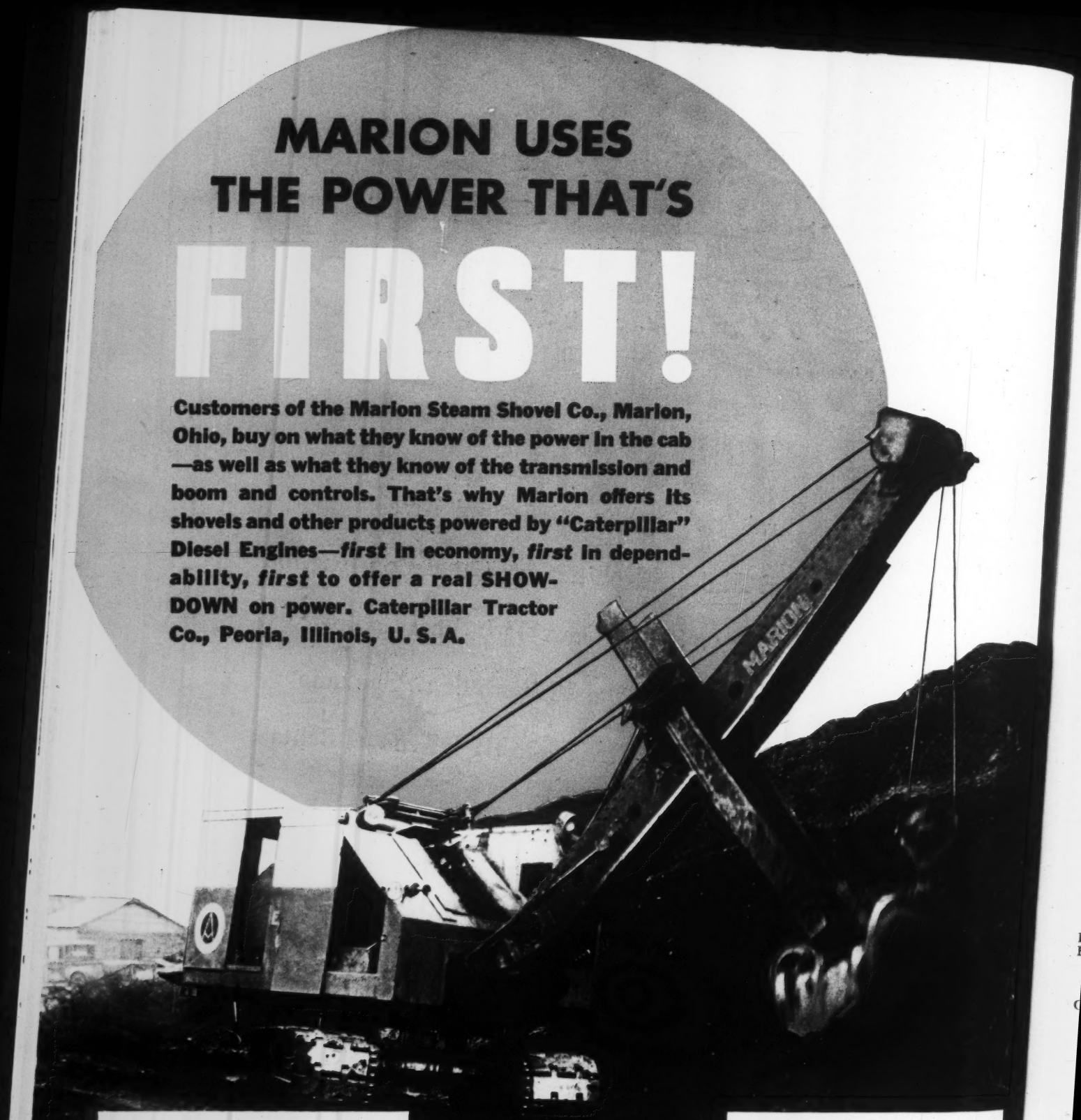

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Will Business Apply These Principles?

FROM a variety of sources it becomes more and more evident that the lessons of the last few years are being seriously pondered by many who are in position to influence the thinking of business, industry and finance. Now it remains to be seen just how widely business will accept the views of these leaders and apply them in practice. On that will depend, to a considerable degree, the eventual outcome of the struggle between those who believe in the state control of productive industry and those who pin their faith to our traditional policy of free individual enterprise.

To illustrate: here are a few excerpts from recent public utterances by business spokesmen. Be it noted that these quotations do not pretend to set forth the complete economic views of these gentlemen. In most cases they are lifted from a context that covered other aspects of the subject which, at the time of publication, may have received greater emphasis from the headline writers. But, as an integral part of their business philosophies, these judgments deserve as full a consideration as has been accorded to other sections of their opinion.

CLINTON L. BARDO—Past President, National Association of Manufacturers:

"Unrestricted competition for private gain, without regard to social service, will not serve. The exploitation of a people's natural resources solely for individual profit will not do. * * * We must balance distribution with production. Men must be able to buy what the machine makes. Our factories must not be idle for want of customers."

ALFRED P. SLOAN, JR.—President, General Motors Corporation:

"Industry must make itself responsible for such an economic balance between wages, selling prices and profits as will promote a soundly based and widely-distributed economic well-being. * * * I am convinced that industry's responsibilities can no longer be adequately discharged, however efficient and effective it may be, with the mere physical production of goods and services."

BRUCE BARTON—Chairman of the Board, Batten, Barton, Dustine & Osborn:

"Research, mass production and low prices are the offspring of business bigness and its only justification."

CHARLES R. GAY—President, New York Stock Exchange:

"Any program that undertakes artificially to control *prices*, wages, *production*, *markets*, savings, investments and *interest* in this nation of 130,000,000 is doomed to failure from the beginning."

(The italics are by this writer. Note that Mr. Gay says "*any* program," which presumably includes control by private business as well as by a governmental agency.)

OGDEN MILLS—Former Secretary of the Treasury:

"We must keep alive the competitive process * * * If we yield to the temptation of resorting to such practices as price fixing and the suspension of competition through combination or agreement, then step by step we shall be led inevitably to government control.

"We must face the fact that in a free economy there can be no security for capital; as on the one hand capital must be accumulated for productive investment, simultaneously other capital must be dissipated through the march of progress.

"We must see to it that the benefits derived from increased efficiency and lower costs are directly and promptly passed on to consumers as the most effective way to insure a wide diffusion of prosperity and increased productivity.

"We must continue the upward trend to real wages; apply our most earnest efforts to the stabilization of employment * * *

"We must stamp out * * * all of those anti-social acts through which men seek to profit illegitimately at the expense of their fellows, not only by statutory penalties but also by the weight of public opinion and of an aroused business conscience.

"We must impress on those of wealth and economic power that they are free to use them neither selfishly nor unscrupulously but with an ever-present sense of public responsibility.

"Self-control of industry means control by those engaged in that particular line of business, efficient and inefficient alike. Their primary interest is to protect the capital invested, and they will certainly use the power granted to them to prevent inroads of fresh capital and any revolutionary changes by way of new methods, new inventions and new processes that would threaten stability * * * Relieved from competitive pressures, owners can be indifferent to costs so long as they are in a position to sell a restricted production at prices that will yield a profit. As producers, therefore, we might tolerate such a system but, as consumers, suffer irreparable damage."

These are but a few expressions, selected from many. They all reflect a keen sense of social responsibility on the part of some business leaders and a clear understanding of the conditions that must be met if we are to preserve the economic system under which we have made such amazing progress during the last generation.

IS BUSINESS, industry and finance as a whole equally sensible of its responsibilities? Is it willing to follow such leadership? On the answer to these questions will depend in great measure the economic history to be written by the next generation.

Willard Chevalier

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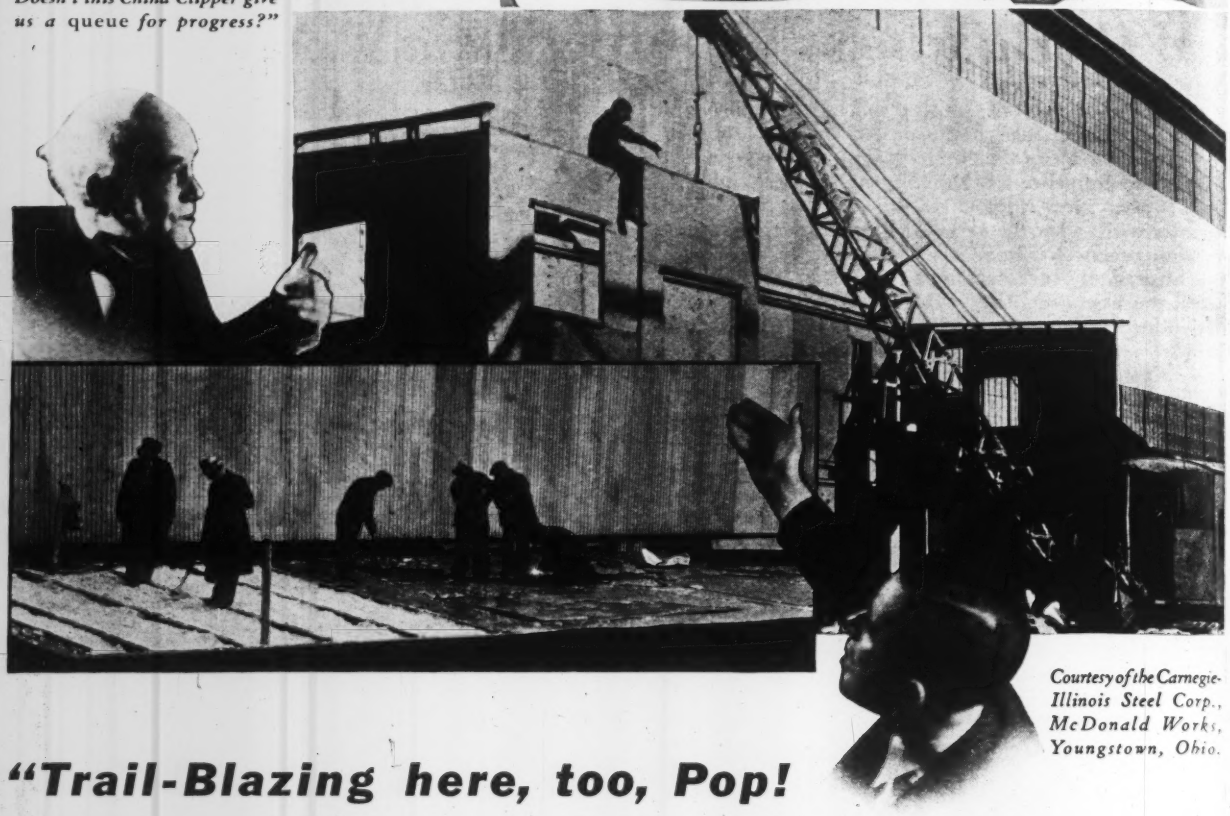

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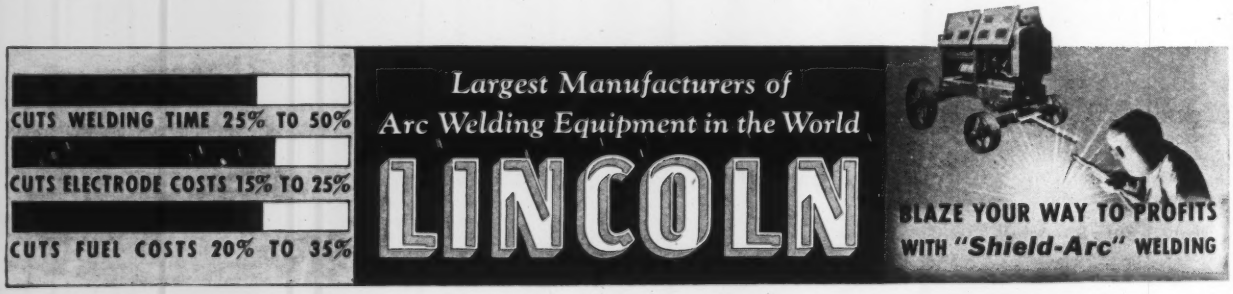
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The recent blizzard snowfalls in the Midwest have been whipped by the greatest snow-fighting army ever mobilized in defense of uninterrupted road and rail transportation. Next week *Engineering News-Record* gives the story of the battle as told by the front-line commanders.

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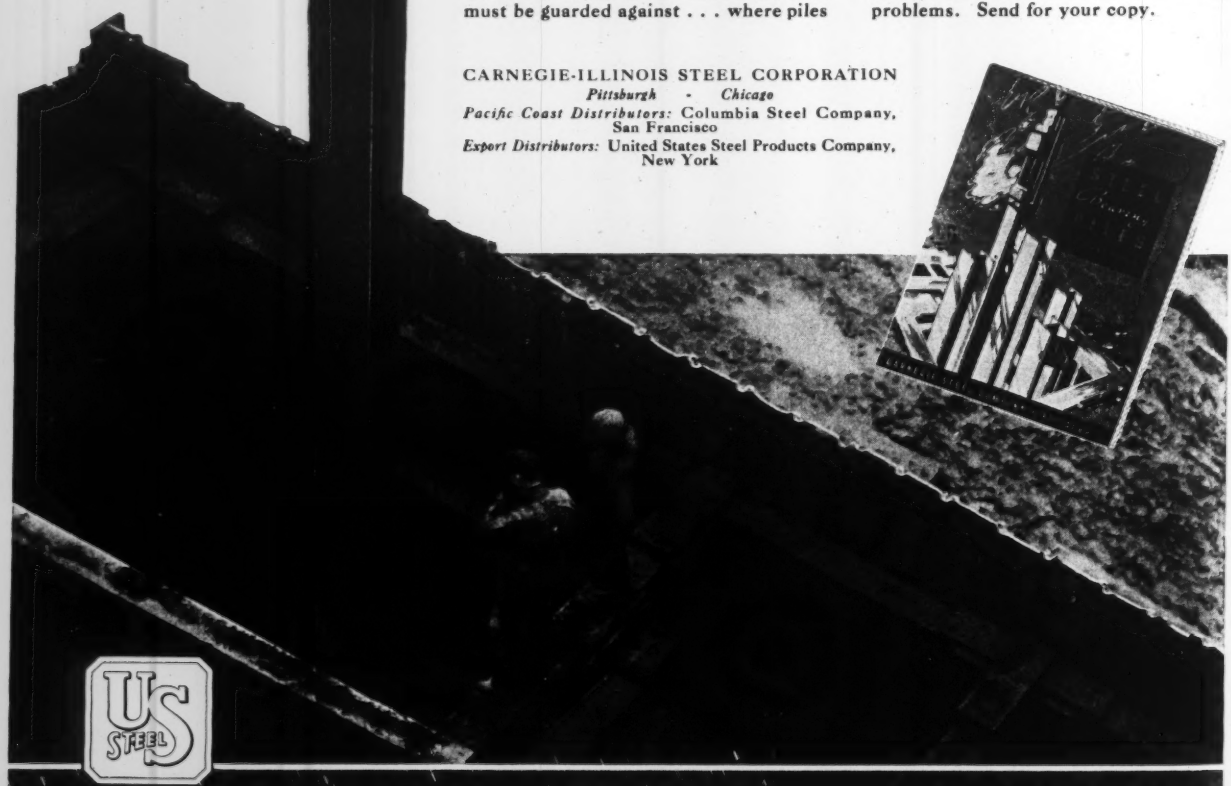

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ENGINEERING NEWS-RECORD

February 20, 1936

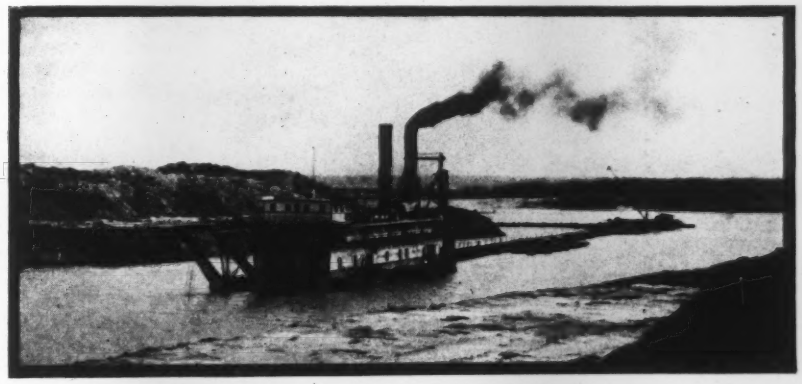


FIG. 1—HYDRAULIC DREDGING has been the means of severing the necks of bends to give the Mississippi River a start in scouring a cutoff channel; the view is downstream at Willow Point.

Straightening the Father of Waters

In the new Mississippi River plan twelve cutoffs have been made between the Arkansas and Old Rivers, shortening the channel over a hundred miles and lowering the river stages

By George R. Clemens

Senior Engineer, Mississippi River Commission, Vicksburg, Miss.

THREE YEARS AGO a bold attack on the historic problem of controlling the Mississippi River was begun along a radically new line. Long-standing tradition asserted that the river's winding course must not be changed and its countless bends must be held at all hazards; accordingly, millions of dollars were spent on dikes to prevent the breaking of narrow necks and on revetment to armor cutting banks against further erosion. In the new attack this tradition was discarded, and cutoffs were made across a number of bends.

Not long after the work began, the situation that then prevailed and the reasons that led to the new plan were outlined in a series of articles in *Engineering News-Record*, beginning June 22, 1933, on the basis of personal observations and interviews by the editors. Now Mr. Clemens, summarizing what has been accomplished to date, reports that the work promises success; the fears of disaster based on former tradition have not been realized, but on the contrary the river is stable and its flood levels have been lowered. A reminiscent mood and an imaginative mind are required to picture what all these facts mean—that the regimen of one of the greatest and most unruly rivers of the world has been changed contrary to all presumptions that change dare not be ventured. In the light of such vision the terse statements of facts by Mr. Clemens take on real color; also it is to be noted that his statement is not personal but is a recording of the determinations and conclusions shown in the official reports of the engineers directing the Mississippi River improvement. The article that follows is the authentic account and the first to be given open publication of the results of a striking experiment in river control.

IN JUNE, 1932, General Harley B. Ferguson, then just appointed president of the Mississippi River Commission, initiated a program of channel stabilization by cutoffs and other means, which has been carried out on a large scale embracing the Mississippi River from the Arkansas River to the mouth of Red River. A series of articles in *Engineering News-Record* beginning June 22, 1933, described the first items of this work. What has happened since?

To orient on the specific work that has been carried out, Table I has been prepared and the various cutoffs marked on the map, Fig. 2; nine cuts have been completed, and three more are under construction; when all are completed, the river, for about 300 miles, will have been shortened about 100 miles. A brief summary of the development of each unit to Dec. 1, 1935, is presented, and aerial photographs taken by the Army Air Corps during the 1935 low water show pictorially the condition at each cut and of the river above and below; these photographs were taken under the personal supervision of Charles W. Schweitzer, engineer, Mississippi River Commission.

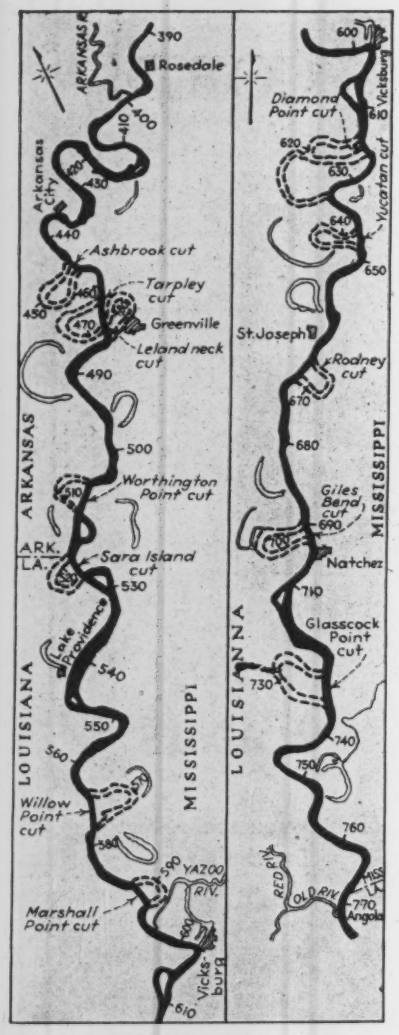


FIG. 2—GOING SOUTH from the various Greenville Bends, twelve loops of the river have been eliminated by cutoff channels, reducing the length of the river 112 miles from Rosedale to Angola.

In more general terms: Old Man River is a mighty force; he employs hundreds of thousands of horsepower every day rolling his mighty floods to the Gulf, wearing away his banks of sand or clay, or grinding channels through his sand bars; he is a moody fellow but is still susceptible of training and may become very docile when controlled and trained in the right way. When the "plug" at Diamond Point Cutoff was dynamited on Jan. 8, 1893, there was released a rushing torrent of water that rolled and tumbled and scoured a channel through the narrow dredge cut until it became deep and wide. The other day the writer passed through the cutoff, and it was placidly flowing along carrying the commerce of towboats and barges as peacefully as the gentle stream which the poets write about.

This, in a measure, pictures the outstanding observation with regard to the cutoffs. Whatever their effects, they have not produced the violent changes that might have been expected. Banks have not melted away above and below the cuts; navigation has not encountered a whipping, twisting river that sought rapidly to regain its length. The changes that have taken place have developed slowly and gradually as befits a monarch as mighty as the Mississippi.

Description of cutoffs

Following the map (Fig. 2) and the aerial views (Figs. 3 to 13), the characteristics of each cutoff are described. Each one had features of individuality which would be lost if they were all discussed in a generalized summary. The map indicates the straightening accomplished, and the views depict river and land conditions prevailing at each operation mentioned.

Ashbrook Cut—Ashbrook Cut, a short distance below Arkansas City, is the farthest upstream and is the last cutoff undertaken. It was opened on Nov. 19, 1935. The neck through which the cut was made formed the upper point of the famous Greenville bends, and as the huge hydraulic dredge tore away the sandy bank these bends passed into history. Where five sharp turns have marked this reach of the river for many years past, two sweeping bends now replace the old alignment and the Greenville bends are no more. They were troublesome bends, and it cost considerable sums to protect them with concrete, willow and stone. On Ashbrook Neck a dike was built to protect it and hold the water back; the present cutoff severs this dike as well as the neck of land and speeds the water on to the Gulf. The portion of the cut completed on Oct. 25, 1935, shows clearly on Fig. 3A.

Tarpley Cut—Tarpley Cut is located immediately below Ashbrook, a short distance above Greenville. Tarpley Neck has been subject to erosion for many years, and a natural cutoff had threatened in this location for some time. In 1932 revetment was placed on the upper bank, and blue holes on the neck were filled with earth to forestall a possible cutoff. Erosion continued, however, and after Leland Cut was made, it became apparent that failure to complete Tarpley in the near future might return the river to the Greenville front, with subsequent return of attack to the revetment at this location, which had been relieved by Leland Cutoff. Consequently work on Tarpley Cut was initiated on Jan. 29, 1935, and completed on April 21, 1935. A total of 5,000,000 cu.yd. was dredged. The pilot channel was largely in sand, and the cut developed quite rapidly to carry about 65 per cent of the flow during the 1935 low-water season. The entire work was completed with two dredges and, with the exception of Leland, it has been the easiest cut to develop. The procedure followed was to dredge a pilot cut about 40 ft. deep and 250 ft. wide, which became enlarged by natural scour following its completion. On Fig. 3B it is interesting to note the large sand deposits in the entrance to the old bend channel below the cutoff.

Leland Neck—A cutoff at Leland Neck had threatened for many years. To prevent this, various dikes had been built on the point and a considerable amount of revetment had been placed on the upper side of the neck. In 1930 a pile dike was built on the point during high water to prevent the river breaking through into some old blue holes that had been formed by the 1929 high water. Toward the end of the 1933 high water a break occurred in this pile dike and a cutoff channel was opened most of the way across the point. To align this channel properly, a small amount of additional excavation was made, which resulted in a low-water channel across the point. This developed rapidly and carried about 50 per cent of the flow during the 1933 low-water season. Following the opening of Tarpley Cut during the 1935 high water, further development occurred and all of the flow passed through the cut during the latter part of the 1935 low-water season. This cut has relieved the attack on Greenville front and places Greenville on an oxbow lake, a short distance from the main river (Fig. 2).

Worthington Point Cut—At Grand Lake, Ark., there is a sharp bend in the river opposite Worthington Point. This

TABLE I—MISSISSIPPI RIVER CUTOFFS FROM ARKANSAS RIVER TO OLD RIVER

As of Dec. 1, 1935, and as determined from the center line at mean-low-water river

Name	Opened (a)	Location by 1913 River Mileage* (b)	Actual River Distance, Miles: Across Neck in 1933 (c)	Around Bend in 1933 (d)	Net Shortening (e)	Length of Cut in Bank Above M.L.W., Ft. (f)	Fall†across neck: At High Water 1929, Ft. (g)	At†Low Water 1931 Ft. (h)
1. Ashbrook	Nov. 19, 1935	443.9–456.4	1.5	13.9	12.4	4,900	5.4	2.8
2. Tarpley	Apr. 21, 1935	461.3–472.3	3.4	12.8	9.4	15,800	1.7	4.2
3. Leland	July 8, 1933	472.3–483.6	1.3	11.6	10.3	4,200	4.2	3.7
4. Worthington	Dec. 25, 1933	505.6–513.2	3.7	9.0	5.3	16,900	3.7	1.9
5. Sarah Island	Under constr.	518.1–526.3	3.1	8.8	5.7	13,400	2.1	2.9
6. Willow	Apr. 8, 1934	563.7–577.9	4.7	13.2	8.5	20,900	4.1	2.2
7. Marshall	Mar. 12, 1934	586.9–593.1	3.1	8.0	4.9	13,400	2.4	2.3
8. Diamond Pt.	Jan. 8, 1933	613.8–625.9	2.4	15.5	13.1	9,200	2.1	4.0
9. Yucatan	Fall of 1929	638.3–648.3	2.1	13.3	11.2	9,500	3.7	2.8**
10. Rodney	Under constr.	664.3–672.0	3.3	9.6	6.3	13,400	2.7	1.3
11. Giles	May 25, 1933	689.4–704.0	2.9	15.2	12.3	10,100	4.6	2.9
12. Glasscock	Mar. 26, 1933	722.5–737.0	4.9	17.8	12.9	20,900	3.2	3.9

*Below Cairo. †Before cutoff was made. **Estimated before cutoff. Total, 112.3 miles shortening.

bend has been protected by revetment for many years, but severe river erosion has continued and as a result there has been a constant heavy expense for repair and replacement. To eliminate this bend, Worthington Point cut was constructed; it was first opened in December, 1933, as a levee machine cut, which required some 3,000,000 cu.yd. of excavation. Although largely in sand, development was slow. From March to July, 1934, about 8,000,000 cu.yd. additional material was removed by two hydraulic dredges. In spite of this, however, the low-water flow through the cut was small. During the 1935 high water considerable enlargement occurred, but it was largely widening with no great amount of deepening. Toward the end of this high water a sand bar started to form on one side at the entrance. This was dredged out, but as the river fell to low stage the head of the cut was partly closed (note this on Fig. 3C) and only a small amount of low water flow passed through the channel during the 1935 low water. Additional time and corrective works will be necessary to make Worthington a fully developed cutoff. It shows in an interesting way that easily erodible banks and bed will not result necessarily in a rapidly developing channel if other factors are not adjusted to this development. Sufficient flow passes through the cut, however, to relieve considerably the attack on Grand Lake revetment. The flow in the cut at the crest of the 1935 high water equaled about 20 per cent of the total river flow.

Sarah Island Cut—To obtain proper alignment in the reach below Worthington Cut, a cutoff is projected across Sarah Island Point. The ultimate alignment desired below Worthington is through Cracraft Chute, Sarah Island Cut and O'Possum Chute, as shown on Fig. 2. Sarah Cut was started during the 1935 high water, but work has been suspended until the recurrence of a high river stage, probably during the early part of 1936. This is one of the later cuts initiated and might be considered as completing the stabilization program in this reach of the river. Up to Oct. 1, 1935, about 2,055,000 cu.yd. of material had been removed from the pilot channel. The method of construction was similar to Tarpley Cut, a pilot channel first being dredged with a large hydraulic dredge. The material is largely sand, and it is expected that enlargement will be obtained by natural scour from the river. The completed portion of the cut may be noted on Fig. 4A; attention is also directed to the manner in which this cut fits an alignment through Cracraft Chute and O'Possum Chute.

Willow Point Cut—Willow Point Cut is located about 36 miles above Vicksburg (Fig. 4B). It is one of the longest operations undertaken and involved several rather difficult problems. It was anticipated that this channel would be somewhat hard to develop, but Old Man River is a contrary individual at times, and in this instance decided he would put forth his best efforts to cooperate on the work. Hence during the 1935 low-water season the regular navigation

FIG. 3—Ashbrook (A), Tarpley and Leland Neck (B) in the Greenville Bends represent about the ultimate in river shortening by cutoffs, while Worthington Point (C) more clearly represents the average.

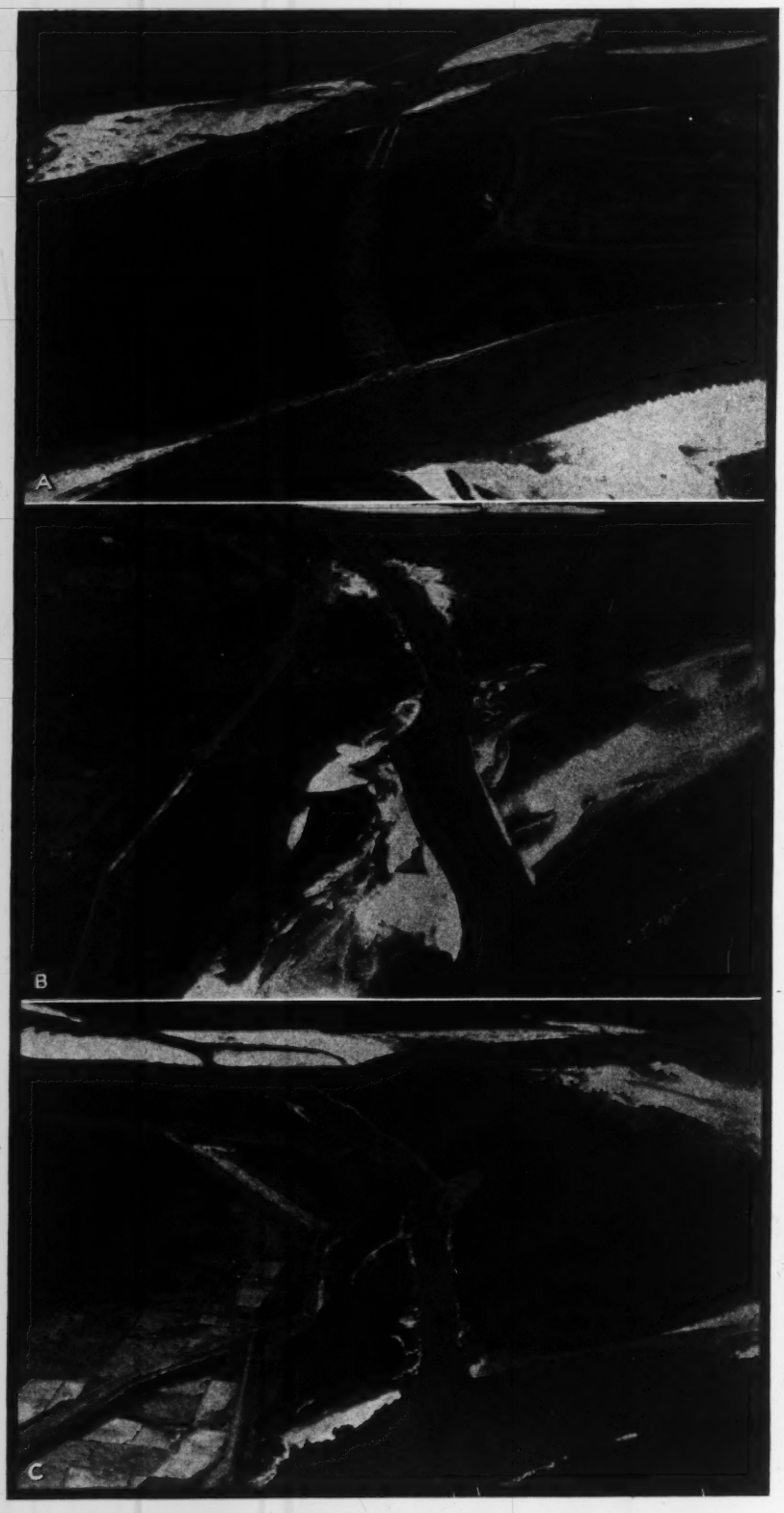


FIG. 4—Sarah (A), Willow (B) and Marshall (C) are about the normal in shortenings, although at Willow the loop begins to approach the long narrow form characteristic of the Greenville Bends.

route and 50 per cent of the total river flow went through the cutoff and a good channel was scoured. The method of construction was similar to Worthington; a shallow cut was made across the point with draglines and enlarged by dredging. The dragline cut was begun on Nov. 19, 1933, and was completed Jan. 26, 1934, a total of 2,400,000 cu.yd. of material being moved. During 1934 about 8,000,000 yd. more of material were removed by four hydraulic dredges. A chute at the lower side of the cut was closed off, and a long channel was dredged across a sand bar below the main cut (note these features on Fig. 4B). For a time during the 1935 high water it appeared that there might be difficulty with the channel across the sand bar. As low water approached, however, the channel shaped up nicely, and a suitable navigation channel has resulted without any maintenance dredging. It should be noted that the channel not only cuts across the sand bar but that it is almost as wide as the river below.

Marshall Point—At Marshall Point, 13 miles above Vicksburg, it was also anticipated that development of a cutoff might be slow. Erosion on Paw Paw Bend opposite the point through which the cut was made had become so severe, however, that it was either a case of revetting this bend or making the cutoff. General Ferguson chose to make the cutoff. Again the river wrote "approved" on his decision and proceeded to develop rapidly a deep, though relatively narrow, channel. This efficient hydraulic channel has increased in carrying capacity until the 1935 low-water flow is divided about 60 per cent in the cut and 40 per cent in the old river. Erosion on Paw Paw Bend has been ameliorated and there is no need for bank protection. Although the channel is not quite as wide at low water as Willow Cut, it is wide enough for navigation and is being used as an alternate route during the 1935 low water. The method of construction was similar to Willow; a shallow pilot cut was made across the upper part of the point by draglines and later enlarged to a small extent by dredging. Across the lower part of the point the initial pilot cut was made with a large hydraulic dredge. The dragline cut was begun Oct. 19, 1933, and completed Dec. 17, 1933; the total excavation amounted to 1,800,000 cu.yd. The pilot cut at the lower side of the point required 2,850,000 cu.yd. of excavation, and the enlargement of the upper cut about 500,000 cu.yd. During the summer of 1934 a sand bar formed in the entrance to the cut. This was removed, involving about 400,000 cu.yd. of excavation, and it has not reformed. No dredging below the cut or in the cut was required in 1935, and a good channel has been obtained (Fig. 4C).

Diamond Point Cut—Diamond Cut was the first to be constructed under the new program. It was opened Jan. 8, 1933, and was described in *ENR*, June 22, 1933. As stated therein, this cut is a short distance below Vicksburg. It returned the river to an old channel in Newton Bend, which it had abandoned in favor of a slightly shorter route

through Palmyra Lake (Fig. 2), with a differential of some 10 miles in its favor.

A number of interesting developments may be noted. First, as the cut deepened through natural scour it was found that the bottom became remarkably uniform. This indicated that there must be something hard at this elevation. Check borings later developed that there was a layer of limestone rock about 50 ft. below low water just below the limit of the borings taken prior to the dredging of the cut. However, 45 to 50 ft. depth at low water is satisfactory but may somewhat retard the development of the cut.

When the river left Newton Bend prior to the time the cut was opened, so much sand had been deposited that it has been a slow process working it out. Until 1935 it was not practicable to carry low-water navigation through this reach below the cut. During falling stages after the 1935 high water, considerable maintenance dredging was conducted, and an alternate navigation route through the cutoff was made possible during the 1935 low-water period. In the cutoff itself the only dredging since its opening has been an improvement of the entrance in August and September, 1934. About 800,000 cu.yd. of material was removed by a hydraulic dredge at that time. The cut has shown a gradual development and during the summer of 1935 carried slightly less than half the flow. Fig. 5A shows clearly the typical sand bar development below a cutoff that has blanketed the caving bank at the right. This type of blanket bar builds rapidly and is usually quite high.

Yucatan Cut—Yucatan Cutoff was made by the river itself during the fall of 1929. It is unusual in that it resulted from low-water caving and accidentally formed an alignment that was favorable for improved river conditions in the reach of the river in which it is located. In fact we might say it was the classic illustration which helped to point the way and allay fears as to the terrible catastrophes that would inevitably result from cutoffs. Its development has progressed gradually without requiring any dredging. The 1935 low-water season finds the old channel closed off up to 25 or 30 ft. above low water, with all the flow below this stage through the cutoff. No serious maintenance dredging problems have developed either below or above the cut. The cutoff is extremely deep, with relatively low velocities at low water. On Fig. 5B note the complete closure of the upper entrance to the oxbow lake and the practically complete closure of the lower end. The blanket bar below the cut also shows up as at Diamond Point.

Rodney Cut—Below St. Joseph, La., the alignment of the river has been such that a cutoff was desirable at Rodney Point, and it was begun during the latter part of the 1935 high water. A pilot dredge cut was started similar to that made at Sarah Point. Work was suspended during the 1935 low water but will be resumed before the 1936 high water, and it is planned to have the cut completed for the 1936 high water. The completed part is shown in Fig. 5C.

FIG. 5—BELOW VICKSBURG, Diamond (A), Yucatan (B) and Rodney (C) show again long loops (least at Rodney) with various necks ready to cut through; that at Yucatan did cut through naturally.

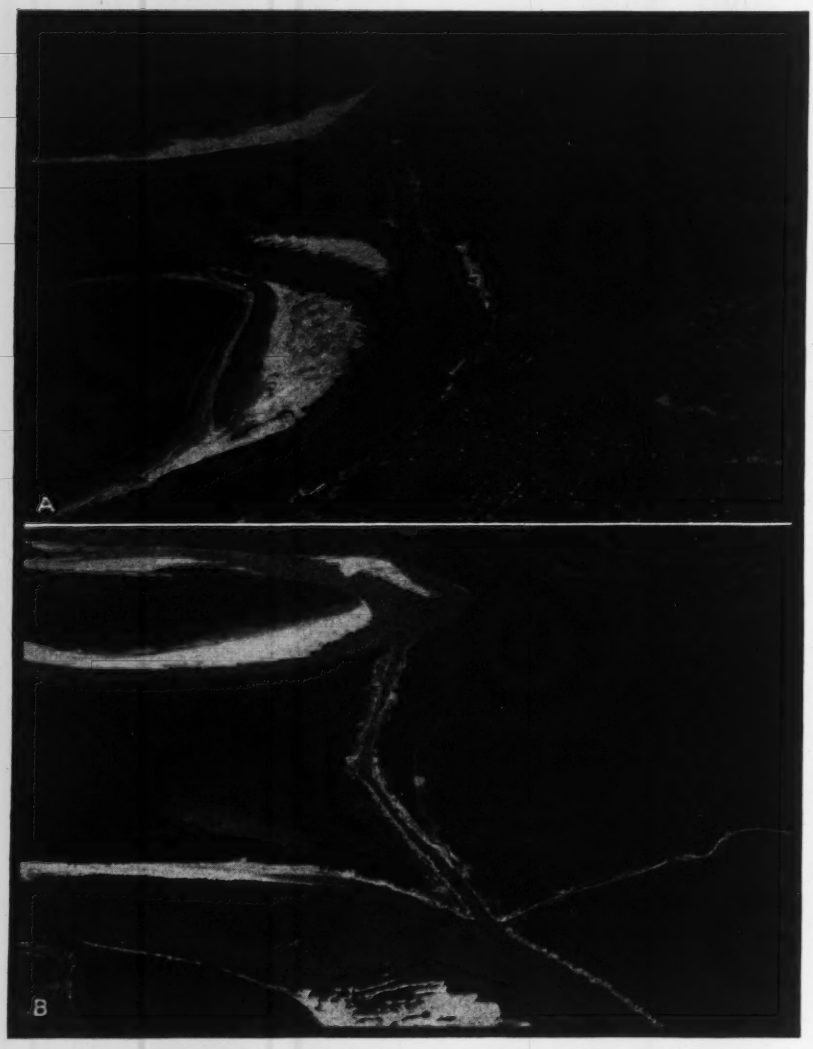


FIG. 6—BEGINNING at about Natchez, the river starts to straighten out except at Giles Bend (A) and at Glasscock Point (B). Cutoffs through these two necks sum up the program of loop elimination to date.

Giles Cut—Giles Cut, a short distance above Natchez, is another place where the river was somewhat contrary. To look at the map, it would appear that one or two deep furrows with a plow across the point would probably result in it cutting off. In fact, a cut was feared at this location, and both revetment and a dike had been built to prevent it. A shallow dragline cut across the point was begun March 24, 1933, and completed May 22, 1933, about 800,000 cu.yd. being removed. To facilitate its development, the cut was enlarged by dredging at the same time, and about 1,200,000 cu.yd. of additional material was removed. The 1933 high water broke through, but when the water lowered the bed did not scour to form a low-water channel. Cypress forests were buried in the bottom of the cut, and they were cemented into an effective dam by Mississippi Valley hard blue mud. During the summer and fall of 1933 about 2,000,000 cu.yd. more of material were removed by hydraulic dredges. The 1934 high water was not sufficient to dislodge this natural dam, and during the low-water season no flow took place in the channel. During the 1934 season 7,000,000 cu.yd. more were cut out by 27-in. hydraulic dredges, and on Oct. 10, 1934, low-water flow passed through the cut. A gradual development has followed, and 1935 low water finds about 40 per cent of the total flow through the cut without additional dredging. The hard banks are still very resistant, and the cut is rather narrow for navigation (as can be noted on Fig. 6A) but is used as an alternate route. After another high-water period it may develop to suitable size for all stage navigation.

Glasscock Cut—Glasscock Point is located about 20 miles below Natchez. The cut across this point is about 4 miles long and has been the most difficult to develop. Scour must occur throughout its entire length before full development is obtained. The middle section of the cut is across an old lake bed, which is so soft it has slid in and closed off all channels cut across it at low water; it is also greasy and slippery and thus effectively resists erosion at high water. There was only a small flow through the cut during the 1935 low-water period and this was insufficient for navigation purposes.

Similar to the procedure at Giles Cut, the initial construction operation was a shallow dragline cut. This involved about 1,000,000 cu.yd. of excavation, which was removed between Jan. 21, 1933, and March 26, 1933. At the same time, but extending into April, 1933, hydraulic dredges moved an additional 1,800,000 cu.yd. After the 1933 high water came up and receded, the low-water channel did not open through. During summer and fall of 1933 a hydraulic dredge moved 3,500,000 cu.yd. As the 1934 water came up, it soon became apparent that this would not scour out a channel. Consequently work was begun during this high-flow period to open up a low-water cut. These operations extended through the low-water season up to January, 1935, although suspended during the extreme low-flow months, and a total of 3,800,000 cu.yd. was removed. The 1935 high water did a large amount of scouring, but two or three dams were left in the channel. As 1935 low water came on, the channel held up fairly well, but at extreme low stages the lake section closed in again and almost stopped the flow. This closure can be noted on Fig. 6B at a point about one-third the distance down from the upper end. Additional dredging is being conducted to remove the dams in the cut and further enlarge the lower end in the hope that the next high water may be sufficient to get a satisfactory channel started.

Résumé of results

The easiest way to picture the development of the cutoffs is to study the percentage of total river flow that they have carried at various stages and times. In Tables II and III there is given a brief summary of typical discharge measurement made in the cuts, showing the percentage of flow that each represented compared to the total river flow in the vicinity at the time of measurement.

These figures indicate that Tarpley and Leland have developed rapidly; Worthington has been slow, particularly for low-water flow; Willow and Marshall built up gradually but were enlarged considerably by the 1935 high water; development of Diamond has been gradual, but it is slowly gaining in capacity; Yucatan took about five years to become a full-size cut at low water; Giles was difficult to start but was advanced quite rapidly by the 1935 high water, Glasscock has been slow to enlarge.

Any conclusions at this time as to the

TABLE II—DISCHARGE MEASUREMENTS, MISSISSIPPI RIVER CUTOFFS, VICKSBURG ENGINEER DISTRICT

	Tarpley Neck				Leland Neck				Worthington Point				Willow Point				Marshall Point			
	Greenville Gage		Discharge Cu.Ft./	% of	Greenville Gage		Discharge Cu.Ft./	% of	Greenville Gage		Discharge Cu.Ft./	% of	Vicksburg Gage		Discharge Cu.Ft./	% of	Vicksburg Gage		Discharge Cu.Ft./	% of
Date	Date	Ft.	Sec.	River	Date	Ft.	Sec.	River	Date	Ft.	Sec.	River	Date	Ft.	Sec.	River	Date	Ft.	Sec.	River
(1933)																				
July	.....	....	.....	.....	July 8	10.4	Cut-off opened	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
July	.....	....	.....	.....	July 16	11.2	26,200	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
August	.....	....	.....	.....	Aug. 7	10.9	83,400	29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sept.	.....	....	.....	.....	Sept. 11	11.8	130,000	44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct	.....	....	.....	.....	Oct. 23	1.5	78,000	54	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov.	.....	....	.....	.....	Nov. 29	0.8	73,000	53	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dec.	.....	....	.....	.....	Dec. 26	15.8	166,000	47	Dec. 25	14.6	Opened	.....	.....	.....	.....	.....	.....	.....	.....	.....
(1934)																				
Jan.	.....	....	.....	.....	Jan. 22	20.3	204,000	42	Jan. 23	17.7	430	0	.....	.....	.....	.....	.....	.....	.....	.....
Feb.	.....	....	.....	.....	Feb. 26	0.6	141,000	67	Feb.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
March	.....	....	.....	.....	Mar. 22	30.0	352,000	41	Mar. 20	29.3	12,000	2	.....	.....	.....	.....	Mar. 12	20.9	Opened	.....
March	.....	....	.....	.....	Mar. 26	27.9	326,000	45	Mar. 26	27.9	12,300	2	.....	.....	.....	.....	Mar. 27	31.0	60,500	8
April	.....	....	.....	.....	Apr. 9	32.0	389,000	42	Apr. 10	32.5	20,800	3	Apr. 8	32.9	Opened	.....	Apr. 9	33.3	84,900	10
April	.....	....	.....	.....	Apr. 30	20.0	263,000	53	Apr. 17	28.7	17,600	2	Apr. 10	33.9	67,700	8	Apr. 30	22.3	51,600	10
May	.....	....	.....	.....	May 14	11.0	174,000	57	May 1	19.8	6,540	1	May 1	21.9	37,800	7	May 7	19.7	42,100	9
May	.....	....	.....	.....	May 22	6.4	151,000	64	May 9	14.3	2,070	.....	May 29	8.2	6,740	3	May 28	8.2	18,600	7
June	.....	....	.....	.....	June 4	3.2	131,000	68	June 21	4.9	5,080	2	June 16	5.0	3,080	2	June 16	5.0	12,500	7
July	.....	....	.....	.....	July 17	1.3	114,000	74	July 31	2.3	2,940	2	July 31	4.4	6,620	4	July 30	4.3	14,100	8
August	.....	....	.....	.....	Aug. 13	1.3	126,000	75	Aug. 14	1.1	1,670	1	Aug. 14	3.4	5,940	4	Aug. 13	3.5	10,900	7
Sept.	.....	....	.....	.....	Sept. 19	1.3	117,000	73	Sept. 27	5.7	8,330	4	Sept. 27	7.2	16,500	7	Sept. 28	7.1	19,300	8
Oct.	.....	....	.....	.....	Oct. 29	0.6	127,000	78	Oct. 12	7.6	10,400	4	Oct. 13	8.9	18,400	7	Oct. 12	9.1	25,600	9
Nov.	.....	....	.....	.....	Nov. 12	2.3	133,000	73	Nov. 13	2.8	4,660	3	Nov. 13	4.4	13,000	7	Nov. 12	4.1	13,600	8
Dec.	.....	....	.....	.....	Dec. 17	15.5	247,000	61	Dec. 18	14.1	32,100	8	Dec. 17	18.7	55,100	11	Dec. 18	17.9	47,300	10
(1935)																				
Jan.	.....	....	.....	.....	Jan. 8	8.6	177,000	65	Jan. 24	24.2	72,800	13	Jan. 27	27.2	114,000	15	Jan. 10	15.0	46,500	12
Feb.	.....	....	.....	.....	Feb. 9	30.3	429,000	53	Feb. 3	31.7	106,000	13	Feb. 10	33.3	141,000	17	Feb. 9	33.9	133,000	15
Mar.	.....	....	.....	.....	Mar. 21	34.7	503,000	50	Mar. 27	39.9	187,500	16	Mar. 29	42.2	298,000	25	Mar. 20	35.8	165,000	17
April	Apr. 21		Opened	.....	Apr. 4	45.4	719,000	50	Apr. 5	45.4	252,100	17	Apr. 16	48.2	385,000	27	Apr. 16	48.2	312,000	22
April	Apr. 22	44.1	66,200	5	Apr. 21	44.2	713,000	51	Apr. 27	43.4	218,000	16	Apr. 30	47.0	367,000	29	Apr. 30	47.0	298,000	23
May	May 30	40.6	407,000	34	May 17	34.8	597,000	60	May 30	40.6	208,000	17	May 14	39.0	294,000	30	May 22	40.3	269,000	25
June	June 22	42.0	517,000	41	June 28	43.4	904,000	70	June 27	43.1	273,000	21	June 29	45.8	433,000	33	June 21	44.8	369,000	29
July	July 2	43.3	597,000	46	July 23	24.0	493,000	83	July 7	42.2	263,000	21	July 14	43.2	372,000	32	July 5	46.0	404,000	30
July	July 31	16.9	423,000	48	July 29	17.1	388,000	91	July 30	16.9	61,900	15	July 27	22.4	169,000	32	July 26	24.4	212,000	35
Aug.	Aug. 29	16.3	228,000	56	Aug. 30	15.7	369,000	93	Aug. 25	17.1	69,200	16	Aug. 16	14.5	155,000	42	Aug. 15	15.0	180,000	47
Sept.	Sept. 30	3.7	105,000	61	*Sept. 30	3.7	173,000	100	Sept. 18	13.5	50,900	15	Sept. 19	14.5	163,000	44	Sept. 20	14.3	179,000	49
Oct.	Oct. 17	0.8	83,600	65	Oct. 18	0.8	128,000	100	Oct. 19	0.9	5,130	4	Oct. 22	2.0	73,000	52	Oct. 23	2.0	86,000	61

*No flow in old bend way channel at this stage.
At Tarpley, Leland and Worthington the per cent of discharge in the river is based on actual and interpolated measurements at Arkansas City.
Vicksburg gage readings were taken from inclined gage (M.R.C.).

ultimate effect of cutoffs on the Mississippi River would be premature. As can be seen from the tabulated data, the development of the cuts is still in its early stages.

For navigation purposes the saving in river distance is already an accomplished fact in many cuts. In a few cases the velocities are troublesome at certain stages. In other cuts the velocities are moderate and offer no obstacle. This is generally true as the cuts become full size. No excessive dredging for low-water navigation has been necessary. Some dredging below

TABLE III—DISCHARGE MEASUREMENTS, MISSISSIPPI RIVER CUTOFFS—SECOND NEW ORLEANS DISTRICT

	Diamond Point				Yucatan				Giles				Glasscock			
	Vicksburg Gage		Discharge Cu.Ft./	% of	Vicksburg Gage		Discharge Cu.Ft./	% of	Natchez Gage		Discharge Cu.Ft./	% of	Natchez Gage		Discharge Cu.Ft./	% of
Date	Date	Ft.	Sec.	River	Date	Ft.	Sec.	River	Date	Ft.	Sec.	River	Date	Ft.	Sec.	River
(1929)					(Opened in fall, 1929)											
(1930)																
(1931)																
May	.....	....	.....	.....	May 14	24.5	161,575	33	.....	.....	.....	.....	.....	.....	.....	.....
(1932)																
Jan.	.....	....	.....	.....	Jan. 13	38.6	343,932	41	.....	.....	.....	.....	.....	.....	.....	.....
April	.....	....	.....	.....	Apr. 11	37.5	492,200	59	.....	.....	.....	.....	.....	.....	.....	.....
July	.....	....	.....	.....	July 27	24.0	392,715	71	.....	.....	.....	.....	.....	.....	.....	.....
Dec.	.....	....	.....	.....	Dec. 20	13.3	222,923	77	.....	.....	.....	.....	.....	.....	.....	.....
(1933)			(Cutoff opened													
Jan.	Jan. 8	34.3	at 11 a.m.)		Jan. 4	25.0	427,525	61	.....	.....	.....	.....	.....	.....	.....	.....
Jan.	Jan. 9	35.0	25,889	3	Jan. 27	36.7	516,319	64	.....	.....	.....	.....	.....	.....	.....	.....
Feb.	Feb. 1	35.7	103,469	12	Feb. 18	37.4	609,849	71	.....	.....	.....	.....	.....	.....	.....	.....
Mar.	Mar. 2	35.6	126,673	15	.....	.....	.....	.....	.....	.....	.....	.....	Mar. 26	32.8	Opened	.....
April	Apr. 28	48.0	303,926	24	Apr. 25	48.0	1,127,487	89	.....	.....	.....	.....	Apr. 3	37.9	2,988	.....
May	May 12	46.2	298,060	26	May 5	47.9	1,085,820	87	May 25	45.7	Opened	.....	May 11	48.9	20,444	2
May	May 30	46.4	366,412	29	May 10	47.0	884,480	75	May 26	46.2	14,250	1	May 31	47.9	22,766	2
June	June 30	19.4	127,712	32	June	.....	.....	.....	June 15	50.0	36,241	3	June	.....	.....	.....
July	July 13	15.0	113,949	34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aug.	Aug. 22	9.9	109,790	44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sept.	Sept. 18	10.5	97,048	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct.	Oct. 23	3.8	56,049	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov.	Nov. 28	2.9	53,410	37	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dec.	Dec 19	7.2	79,820	37	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(1934)																
Jan.	Jan. 23	22.0	230,907	44	Jan. 11	13.9	310,347	86	.....	.....	.....	.....	.....	.....	.....	.....
Feb.	Feb. 27	3.6	65,926	42	Feb. 5	7.4	217,124	94	.....	.....	.....	.....	.....	.....	.....	.....
Mar.	Mar. 26	31.7	281,938	35	Mar. 28	30.0	665,511	86	Mar. 26	34.9	8,121	.....	Mar. 22	34.0	10,888	.....
April	Apr. 16	34.4	326,562	40	Apr. 17	33.6	735,893	95	Apr. 14	37.3	16,124	.....	Apr. 13	37.4	23,757	.....
May	May 15	12.6	146,554	44	Entire low-water flow in cutoff				May 4	25.0	1,752	.....	May 1	26.2	5,158	.....
June	June 28	8.1	116,857	45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
July	July 14	3.9	71,124	43	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aug.	Aug. 18	2.0	52,885	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sept.	Sept. 28	7.1	107,040	46	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct.	Oct. 12	9.0	128,559	46	.....	.....	.....	.....	Oct. 13	11.5	30,346	11	.....	.....	.....	.....
Nov.	Nov. 24	6.3	92,724	44	.....	.....	.....	.....	Nov 30	12.0	41,091	12	.....	.....	.....	.....
Dec.	Dec. 29	9.5	131,333	46	.....	.....	.....	.....	Dec. 14	21.7	58,471	12	.....	.....	.....	.....
(1935)																
Jan.	Jan. 19	51.1	184,756	48	.....	.....	.....	.....	Jan. 8	16.5	52,712	16	Jan. 27	30.7	36,020	5
Feb	Feb. 16	25.1	309,174	50	.....	.....	.....	.....	Feb. 8	37.0	121,565	14	Feb. 9	36.9	68,461	8
Mar.	Mar. 29	42.2	527,062	45	.....	.....	.....	.....	Mar. 29	43.0	176,034	16	Mar. 28	42.5	101,012	9
April	Apr. 26	47.6	604,460	45	.....	.....	.....	.....	Apr. 23	50.3	265,857	20	Apr. 24	50.3	170,986	13
May	May 24	40.9	559,179	52	.....	.....	.....	.....	May 18	43.2	223,358	22	May 31	45.9	125,323	11
June	June 24	45.1	645,000	49	.....	.....	.....	.....	June 27	48.7	331,042	27	June 10	47.9	135,628	11
July	July 5	46.0	669,000	54	.....	.....	.....	.....	July 30	25.4	151,276	28	July 8	49.2	161,682	13
Aug.	Aug. 30	17.5	236,686	55	.....	.....	.....	.....	Aug. 17	17.9	144,327	44	Aug. 12	21.6	41,045	10
Sept.	Sept. 20	14.3	175,074	48	All flow below approximately 25 ft.				Sept. 28	9.3	98,286	48	Sept. 19	16.8	21,404	6
Oct.	Oct. 25	2.0	49,772	37	on Vicksburg Gage in cutoff				Oct. 21	4.8	65,891	47	Oct. 3	7.2	4,068	3

Note: Vicksburg gage readings were taken from inclined gage (M.R.C.).

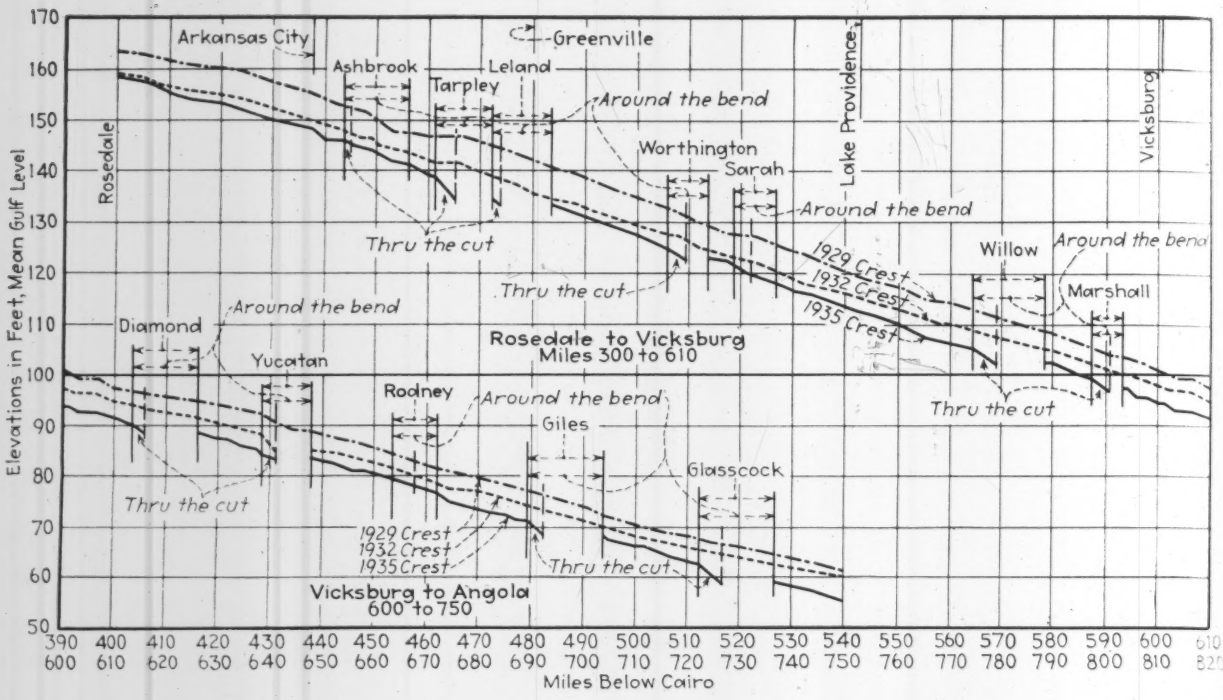


FIG. 7—LOWERING of flood crests has followed the river shortening by cutoffs between the Arkansas River and Old River.

Diamond Cut was anticipated and has been required. Very little dredging for navigation maintenance above cuts has resulted.

A number of revetments have been rendered unnecessary by the cuts, and both the expense for new construction and the maintenance of existing revetments have been saved. Below Leland a certain amount of new revetment has been constructed. A number of years will be required to determine the full value of the cuts to navigation.

The question of effect on flow lines is frequently discussed. In 1935 a flood occurred that shows a greater measured peak flow at Arkansas City than the flood of 1932, which occurred before any cutoffs were made. Fig. 7 shows the comparison of the crest elevations of these two floods and the 1929 crest at various points along the Mississippi from the Arkansas River to Old River. This shows the 1935 crest flow line considerably below the crest line of 1932 between Arkansas City and Natchez.

Housing Research at Purdue University Continues Rapid Progress

SINCE the housing research project at Purdue University was launched in June, 1935, nine houses have been placed under construction. The project represents the first attempt on the part of private industry to make a critical study of building construction methods, materials, planning and costs, in so far as single-family houses are concerned.

It has been the aim to undertake the work in exactly the same manner as would be done by a scientifically minded individual owner. First a brief specification was established covering the nine houses in the first group. Plans and specifications for each house were then prepared by an architect and bids obtained from several contractors. A maximum cost limit of $5,000 was established, since it was determined that it was not practical to build substantial houses under present conditions for less. Specifications call for a house designed for the use of a family of four persons—two adults, a boy and a girl. Also each house must demonstrate the use of a basic structural material, of equipment or planning not duplicated in another house in the group. Although associations and individuals interested in structural materials have been consulted, discounts or price concessions are not permitted, so as to keep the project free from commercial bias and make the results represent actual consumer costs.

The first nine houses demonstrate the use of wood, brick, steel, reinforced concrete, prefrabricated units, Haydite block, wood frame and stucco, steel frame and Rostone.

While the field work has been going on, studies have also been made on what housing should cost from the standpoint of the consumer. As a part of this study it has been indicated that a $2500 house is too expensive for 35 per cent of American families; that a $3400 house is too expensive for 53 per cent; that a $4200 house is too expensive for 66 per cent; that a $5100 house is too expensive for 75 per cent, and that a $6100 house is too expensive for 80 per cent of American families.

A third study relates to possibilities of cost reduction, and preliminary results are discouraging. In materials, a great share of the cost is represented by distribution charges; no reduction in these appears possible short of a complete revolution engineered through the combined efforts of the entire building industry. Manufacturing costs are also not capable of being reduced very much. Furthermore, while hourly wage rates are high, annual earnings are very low, so that labor-cost reductions are difficult. Most new developments in housing, it is found, look to providing a better product at an extra cost, rather than reducing the cost on existing materials and equipment.

Spokane Garbage Incinerator Has Novel Pre-Drying Feature

Separate chamber for dry refuse and mechanical stoker designed for wet garbage are combined for efficiency—No maintenance expense in nearly five years operation

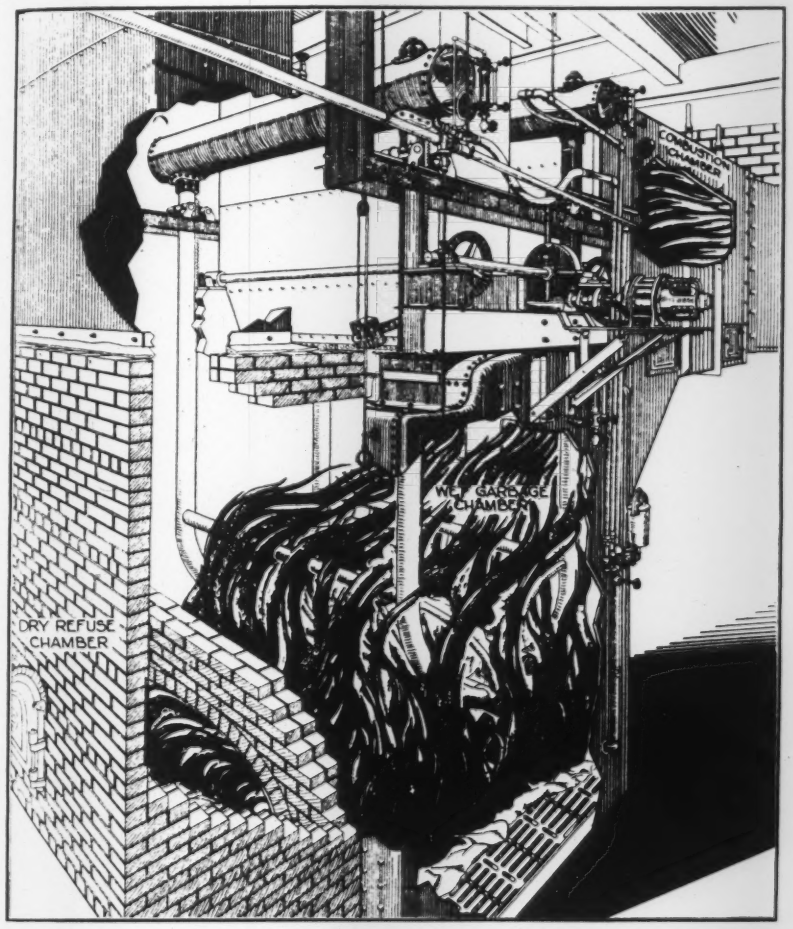


FIG. 1—PERSPECTIVE OF THE INCINERATOR, showing the suspended pre-drying grate. Heat and flames from the dry-refuse chamber pass through the water-jacketed basket grate before entering the flue that goes to the stack.

UNTIL about five years ago Spokane, Wash., had much the same sort of struggle with the garbage-disposal problem as do many cities—and with no better success. Then an experiment was tried based on reasoning of the superintendent of the incinerator. He believed that wet garbage could be burned satisfactorily if (1) most of the moisture could be driven off first and (2) the pre-dried garbage could be fed a little at a time onto the firing grate. He worked out plans for accomplishing this objective with a very simple mechanism that would not be expensive to build or to operate. City officials were convinced that the idea was sound, and accordingly equipment was built and installed. In the period of nearly five years since that was done this Spokane development has been in operation, and records show a highly satisfactory disposal of garbage at a low cost per ton. The total repair and maintenance cost on the entire operating mechanism has been less than $9.

The existing plant in which operations have been conducted during this period is not in all respects ideal for the new-type equipment. Prior to installation the city already had investment in an incinerator, including a tall concrete chimney and a fire box built for an incinerator of radically different design. To keep the initial cost down, therefore, the old stack and the old fire box had to be used, and it was necessary to adapt the design of the new equipment to fit the limitations imposed by structures already in place. This was not an insurmountable difficulty, but it made it impossible to provide the best arrangement of baffle plates. As a result the unit probably operates at a somewhat lower efficiency than would be expected in a plant laid out for this type of mechanical stoking with separate fire box for dry refuse.

Instead of dumping wet garbage directly on a firing grate or over the material burning thereon, the designer's idea was to dump garbage, a truckload at a time, into a drying grate suspended within the main combustion chamber about 4 ft. above the firing grate. Thus heat and flame from the firing grate as well as from a dry refuse chamber adjoining can pass through and around the wet garbage to evaporate moisture from the mass before it reaches the fire.

The drying grate consists of two sections or halves, each with two vertical stems projecting up through the top of the furnace. These stems and, in fact, the entire drying grate consist of pipes through which water circulates continually to keep the temperature of the metal within limits consistent with long life. Each half of the grate is operated slowly up and down; one-half is at the top while the other half is at the bottom, thus balancing the movements and making them equal and opposite. During this movement the halves remain the same distance apart.

This action makes the suspended basket grate a mechanical stoker as well as a place where the garbage is dried out so that it will not smother the process of combustion that is taking place on the firing grate below. As the wet garbage dries, fragments fall through the spaces between pipes and feed the fire. This is only supplemental, however, to the major process of feeding from the bottom of the grate. The limits of travel of the two halves of the grate are set so that as each reaches its lowest point, the vertical space between bottom headers is wide enough to permit some of the dried-out garbage in the bottom to fall out. Thus discharge occurs successively from each of the two halves. The frequency and quantity of these discharges are controlled by regulation of speed and travel distance.

The two halves of the drying grate are duplicates. The outer frame of each consists of extra heavy 6-in. pipe. The upper headers are 4-in. extra heavy pipe, and the small tubes are 2-in. standard pipe. All joints are welded, and the curvature in the pipes takes care of expansion and contraction. The curvature in pipes of the 2-in. group is varied so that alternate pipes will be in different planes, thus giving an ir-

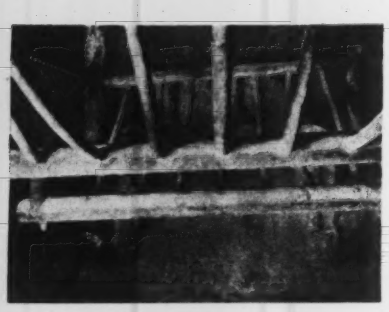


FIG. 2—INSIDE of the combustion chamber, showing the two halves of the suspended basket or pre-drying grate. Note the welded construction with curved pipes to avoid destructive strain from expansion as the result of high temperatures.

regular surface to the mass of wet garbage, to facilitate access of heat and flames in driving out moisture. Both top and bottom headers are slightly inclined to give automatic thermal circulation. The design of the water-circulation system is such that flow resultant from thermal effect is positive and rapid. The tank at the top on each half of the grate has a capacity of 100 gal.

The use of a worm-reduction gear and a counterbalance (which moves up and down with the vertical movement of the drying grate) so reduce the power required for operation that a 3-hp. motor is ample. A reversing variable-speed motor, direct-connected to the reduction gear, is used. An adjustable reversing switch automatically reverses the motor when limit of travel is reached and of course reverses the direction of gate travel. The wider the difference between the levels of the bottom headers in extreme positions the greater the amount of garbage fed onto the firing grate at each cycle of the pre-drying grate movement. The speed at which the drying grate should move up and down varies with moisture content in the garbage and other factors; ordinarily this is set between 30 and 60 sec. per complete cycle.

While dry refuse such as excelsior, large quantities of paper, etc., may go through the drying grate, more useful disposal of such refuse is made by dropping it into an adjacent chamber where it is allowed to burn separately, thus supplying heat and flame to pass around the drying grate en route to the stack. Wooden boxes and other dry refuse are set aside on the charging floor for use in starting up a cold furnace, thus keeping to a minimum the cost of cordwood used when starting up.

The dry-refuse chamber is lined with firebrick. The main combustion chamber around the drying grate in this installation is a low-temperature type of furnace. This limitation was imposed by the relative position of the stack and fire box over which there was no control when this installation was made. A water jacket is sufficient for a low-temperature furnace of this type. In a design expressly adapted to the novel features developed in this incinerator and with proper baffles between combustion chambers and the stack, higher temperatures could be used and fire brick lining probably would be required in the combustion chamber. In this installation the firing grate is 10x9¾ ft. in plan, and the height from firing grate to crown sheet is 9 ft. 11 in.

Charging is done entirely from a floor above the drying grate; a ramp on the outside of the building makes this floor accessible to garbage trucks. Openings in the charging floor to the drying grate and also to the dry refuse chamber are closed by sliding metal covers when not in use. When a truck containing wet garbage exclusively drives onto the charging floor, it moves to a position from which it can dump into the opening over the drying grate. If the load is for the dry-refuse chamber, it stops over that opening. If both classes of material are included, the truck may stop between the two openings, which are only a few feet apart, or successive moves may be made to reduce the amount of forking by hand.

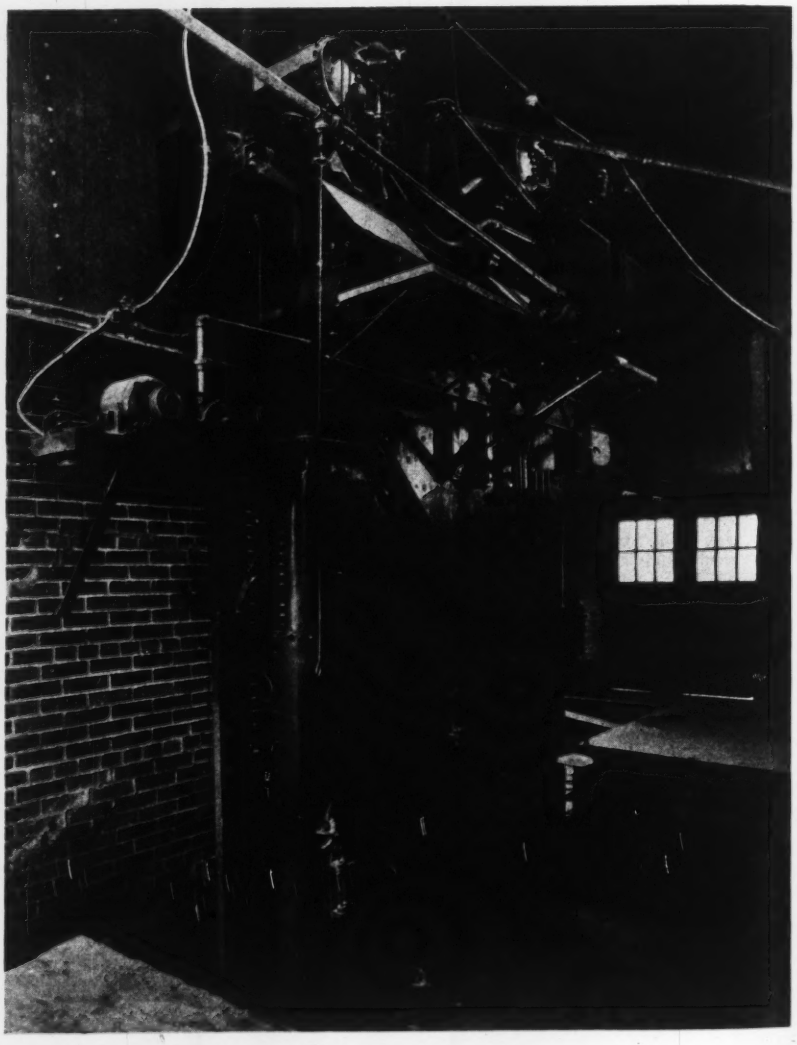
TABLE 1—RECORD OF TEST RUNS OF SPOKANE GARBAGE INCINERATOR

	Test No. 1	Test No. 2
Tons of garbage and rubbish burned	190.65	43
Per cent dry rubbish (weight)	22.4	27.3
Per cent wet garbage (weight)	77.6	72.7
Time required (hours)	57.75	11.75
Total labor cost at plant	$57.03	$13.56
Total fuel cost (cordwood)	$11.93	$1.79
Total operating cost (fuel and labor)	$68.96	$15.35
Cost per ton	.362	.357

Two test runs to determine cost and capacity of the Spokane unit gave the results listed in Table 1.

The incinerator described in the foregoing was developed and has been patented by Harlan Coe, superintendent of Spokane's crematory division. A. D. Butler is city engineer.

FIG. 3—AN INTERIOR VIEW of the furnace below the charging floor. At left is the refuse chamber, in the center is the water-jacketed wet garbage chamber from the top of which project the stems of the basket grate terminating in water tanks.



Subgrader and Concrete Finisher of New Design for Large Canal

Two novel machines, developed for work on open canal portions of Colorado River Aqueduct, trim subgrade exactly and place well-compacted concrete lining without joints—Progress rapid, unit costs low

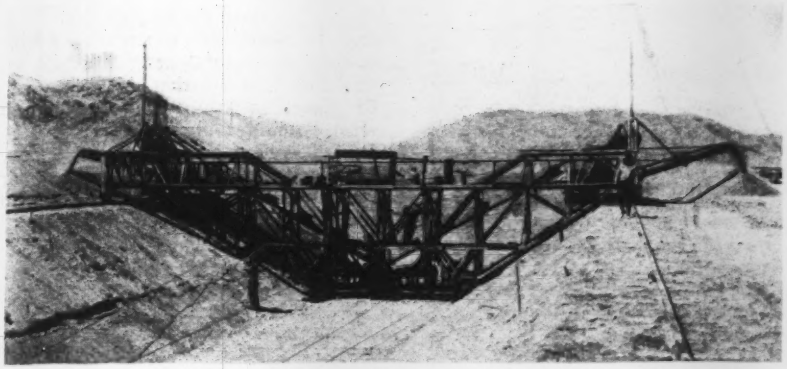


FIG. 1—FRONT VIEW of subgrader accurately trimming canal section. Entire weight was supported on rails 61.5 ft. apart. Belts stack the spoil in windrows on either side of the canal excavation.

THE Colorado River Aqueduct includes 62 miles of open canal section which will have a water depth of 10.2 ft. and a top width of 57 ft. These figures suggest the problems of new equipment and new methods that confronted the builders of such a large canal. Questions as to the best construction methods centered around two operations: (1) accurate trimming of rough excavation to the exact line and grade required for bottom and side slopes of the canal; and (2) effective placement in a canal of such large cross-section of the reinforced-concrete lining, which ranges in thickness from 6 to 8 in. In both these operations the crux of the problem was speed, as slow progress meant high costs. Methods heretofore used were not suited to speedy operations in a canal of this size.

The Metropolitan Water District of Southern California, by whom the aqueduct is being built, split up the 62-mile length of open canal work into nine "schedules," and contracts were awarded to five different contractors. The construction problem, therefore, was attacked from five different angles.

Attempts were made to apply highway paving methods; an adaptation of the rather complete system developed in the Kittitas canals (*Engineering News-Record*, Nov. 7, 1929, p. 722) was tried out; and entirely new experimental equipment was built and, in some instances, junked with attendant loss. Out of these experiences have come two pieces of heavy construction equipment that represent distinctly new types. These are the subgrader and the monolithic paver or concrete finisher. Machines of these two types were in use on or were under construction for all important canal schedules that remained unfinished at the first of this year.

The low unit cost incidental to the use of these large machines made it possible to perform operations that otherwise would not have been feasible within the limits of funds available. It is the generally accepted observation along the aqueduct that the subgrader and monolithic paver have saved the contractors from loss on the open canal schedules. One contractor estimated that the total cost of his pair of machines was offset by the time saving that they effected.

The subgrader

The subgrader, designed to trim the roughly excavated ditch to exact canal section, is in use by different contractors in more than one form. Patents have been applied for on widely different designs such as the scraper blades for trimming side slopes and bottom in lieu of excavation by the chain bucket principle. Similarly, four monolithic pavers were built for as many schedules, and each had its own peculiarities. The detailed description in the following refers to the two pieces of equipment developed by C. W. Wood expressly for the 8-mile portion of the open canal work on which he was engaged. His machines, the first of this type to be used on the aqueduct, were designed and built in his own machine shops and were put in service last March.

The fundamental idea on which the subgrader was developed came from experience of its inventor some fifteen years ago in lining small irrigation ditches with a machine for trimming a roughly excavated trench to accurately predetermined side slopes and grade. A major requirement of a mechanical device for trimming up the aqueduct canal slopes was that it should not require supplemental hand labor in time-consuming finishing operations. The subgrader was designed as a rigid structure spanning the canal supported by a heavy rail (75-lb. T-rails were used) set on either bank. These rails were set back 2 ft. from the edge of the finished slope and were spiked to ties; the rails had a separation of 61.5 ft. center to center. They were carefully set to line and grade, and this alignment was the only occasion for using transit and level instruments, other than for checking finished grades, throughout the job of subgrading and lining.

A feature that made it possible to cut to line and grade without the attention of skilled operators was the thoroughly rigid framework supporting the subgrader mechanism. The frame consists of a 30-ft. end truss on either side of the canal, set parallel to the canal center line and fitted with double-flanged wheels resting on the heavy T-rails. Between the end trusses and extending across and down into the canal are three truss members that hold the machine rigidly in alignment and transfer the weight to the rails.

The earth-cutting mechanism consists of two specially designed side-digging bucket lines operating at right angles to the canal center line. Each of these runs from a point past the center line of the canal across half the bottom and up one of the side slopes. Buckets, chain links and rollers were built of a nickel alloy steel with a special hardening treatment to resist abrasion of desert sand. Each bucket line comprises fourteen buckets of 1-cu.ft. capacity welded to a link of the chain. The link rollers fit between the flanges of a 4-in. channel iron similarly hardened to resist wear. The channel irons are attached to the main cross-trusses and hold the buckets rigidly in position. This assures that cutting will be exactly to grade even through the hardest cemented gravel.

The bucket lines travel from the center of the ditch across the bottom and up the slopes, dumping excavated material through the top of the buckets as they overturn on arrival at the top of the slope. Spoil thus discharged lands on a short 24-in. cross-belt delivering to a 24-in. conveyor paralleling the bucket line. This second conveyor, discharging continually, leaves a windrow of spoil well in the clear on either side of the canal. Each bucket line is served by a conveyor system, and the spoil is piled on both sides of the canal.

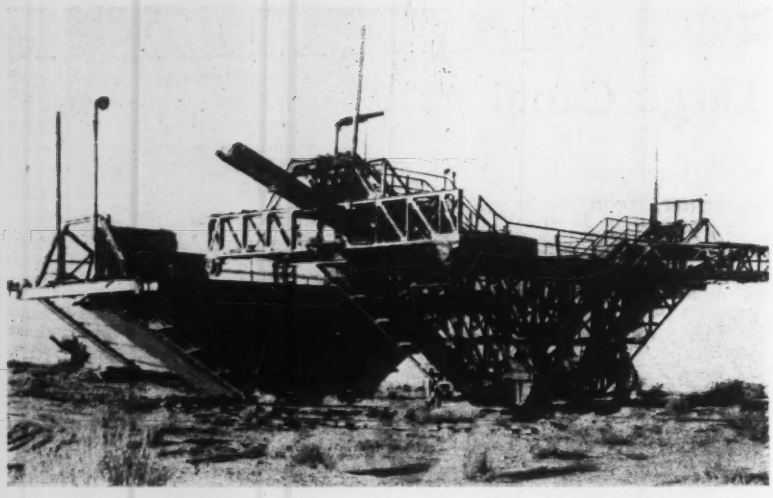


FIG. 2—SUBGRADER (right) and concrete finisher (left) after removal from the canal. On the subgrader note the bucket line on the sloping face of the near side. Overhanging discharge belts project through supporting truss.

A 25-hp. geared electric motor operates each bucket line. The speed is regulated so that a complete circuit is made in 30 sec.; that is, 28 buckets pass a given point each minute. The forward travel speed is approximately 1 ft. per minute, and thus each bucket cuts into the face for a bite about ½ in. deep. Each bucket has a tooth with a detachable point, and it is this tooth that digs to grade; excessive wear on the bucket itself is thus prevented, and new tooth replacements are inexpensive.

These bucket lines are followed with a clean-up blade set to the exact grade of the canal and effective in scraping up all "crumbs" that get by the buckets. This blade is the means by which the surface of the cut is left in absolutely finished condition without the need for any hand trimming. The function of the subgrader is to clean up the rough excavation made by the draglines and to finish that excavation to the exact grade and side slope prescribed for the canal section. The dragline excavation must be handled carefully to avoid the necessity for watering and tamping in "overbreak" in the subgrade. To be safe on this score, dragline operation was directed forward leaving 6 in. to 1 ft. of material above grade in the rough excavation. Thus it was not unusual for the subgrader to be moving nearly 2 cu.yd. of excavation per minute in addition to fulfilling its function of shaping the subgrade. This removal and complete finishing operation on the subgrade were accomplished in one trip.

Because of hard materials encountered and the fact that the cutting edges are more than 12 ft. below the rails, thus producing large overturning moments as well as uplift, no attempt was made to develop a self-propelling machine. Instead, forward travel is accomplished by means of a two-drum winch mounted on the front truss about one-quarter way up the slope from the canal bottom. This winch is powered with a 2-hp. geared electric motor and a two-part, $\frac{9}{16}$-in. cable running from the winch to a dead-man, and dead-ended back on the frame. To expedite travel, a 60-hp. tractor with a bulldozer nosed into the ground served as the dead-man.

With travel speed at 1 ft. per minute when the drums are empty, increasing to nearly 1½ ft. per minute when the drums are full, the advance per 8-hour shift ranged from 500 to 600 lin.-ft. of canal. Thus the average performance per shift represented 30,000 to 36,000 sq.ft. of finished subgrade. Repeated checking showed the surface to be finished not more than 0.01 ft. from true grade.

The subgrader weighs approximately 50 tons, and special provision was required to get it across inverted siphons, fourteen of which interrupt continu[ity] in the 8-mile stretch on which the m[achine] was first employed. The crossi[ng] was effected by transferring the po[rt] of support of the subgrader from whe[el] at the top of the canal to a track [on] narrower gage laid on the bottom. I[n]clined tracks at each end of such [a] stretch effected the transfer from o[ne] set of rails to the other.

The monolithic paver

The monolithic paver or concret[e] finisher is a machine designed to follo[w] along the canal behind the subgrade[r] and to place the concrete lining o[n] bottom and side slopes. Essentials o[f] this operation are that the lining must be placed exactly to line and grade, must be well compacted ready for the final troweling by hand, and the operation must be performed speedily and economically. A great advantage of the finishing machine is that it elimi-

FIG. 3—REAR VIEW of the concrete finisher. Advancing with it are two mixers mounted on crawlers on the far side of the canal. Progress is 500 ft. in 8 hours.

nates need for construction joints longitudinally along the lines where bottom and side slopes intersect. In fact, instead of weakness resulting from joints along these lines, the use of a short-radius curve on the forms at this joint strengthens the lining here and gives the canal a smoother finish.

The finisher is supported from the subgrader rails, which remain undisturbed between the two operations. The end trusses of the finisher, as in the subgrader, have a 30-ft. length. Because of the absence of moving parts in this machine, two very stiff transverse trusses were sufficient to maintain the desired rigidity. These trusses support a ½-in. steel plate or slip-form, whose outline is exactly the shape of the inside finished cross-section of the canal. The plate is 6½ ft. long, measured along the

canal center line, and its front and back edges are rolled to a 4-in. radius to avoid risk of disturbing the concrete surface as the form moves over finished work. On the bottom the plate is squarely across the canal. The plates on the slopes, however, are set on a slight angle so that the forward edge at the top is 2 ft. back of the forward edge at the bottom of the slope, measured parallel to the canal center line. This angle or rake was provided so that freshly deposited concrete would have support from below.

Across the forward end of the machine is a continuous vertical hopper 18 in. wide and 2 ft. high. Into this is discharged concrete delivered from the distributing car, which moves back and forth on top of the main truss. The car keeps the hopper full, and a uniform supply of concrete is maintained along the advancing edge of the slip-form. Vertical baffle plates are set on 12-in. centers in the hopper to retain the concrete in the location where it is deposited until it feeds into the canal lining slab. Above the hopper and on the side toward the machine an inclined apron serves as a continuous chute, thus making it possible to discharge concrete at all points along the cross-section without the necessity of stopping the distributing car.

From this it will be seen that the plan of operation is to maintain a uniform head of freshly mixed concrete along the entire length of the continuous hopper and the slip-form that follows it. With the supply of concrete so maintained, it is only necessary to advance the machine slowly. Thus the space between the subgrade and the slip-form is filled with concrete forced down by pressure of the material in the hopper above.

Forward travel of the finisher is accomplished by two single-drum winches, one mounted on each end truss and driven by a 2-hp. geared electric motor. A two-part, ⅜-in. cable passes from the winch through a sheave fastened to the rail ahead and back to the main frame. The normal travel speed for which the finisher was powered it 1 ft. per minute.

In planning for compaction of the concrete after delivery to the hopper, no data were found on the amount of vibration required in a concrete slab 6 to 8 in. thick. All information on this subject referred to mass placement of concrete. Ordinary tamping action on the side slopes was not deemed advisable because of the tendency to push the mass down the slope before the space beneath the slip-form was entirely filled. Internal vibration by conventional hand vibrators moved along in the hopper was not considered because, by reason of the constantly moving form, an excessive number of vibrators and operators would have been required.

It was finally decided that the most efficient placement could be accomplished under the side slopes by internal vibration, using a full-length vibrator tube placed near the bottom of the hopper and extending from the top to the bottom of the canal. Experimental tubes 3 in. in diameter and 22 ft. long were built, tested and ultimately installed on each side slope of the finisher. Experimental operation of these tubes showed that it was possible to overvibrate the concrete and actually to float the 50-ton finisher on the concrete surface.

The most effective vibrator speed was found to be 2,500 r.p.m. Each vibrator was operated by a belt connection to a 10-hp. motor. This equipment required very little attention and resulted in uniform feeding of concrete from the hoppers into the canal-lining prism in a highly satisfactory manner. Because of difficulties in driving internal vibrators in the level section or bottom of the canal, placement and compaction here were accomplished by means of external vibrators of the magnetic type, vibrating the entire plate. Although this worked very effectively for the flat sections, experience showed that it was inferior to the long internal vibrator on the side slopes. No movement of concrete down the slope in back of the slip-form ever was experienced. Concrete with a slump as high as a 3-in. flow occasionally was used without change in the satisfactory finish of side slopes.

To summarize the functioning of the finishing machine, it may be said that in effect it is a large trowel whose forward edge is kept from 1 to 1½ in. above the finished grade for which the rear end of the plate is set. This throws the total weight of 50 tons into the final compression of the concrete lining.

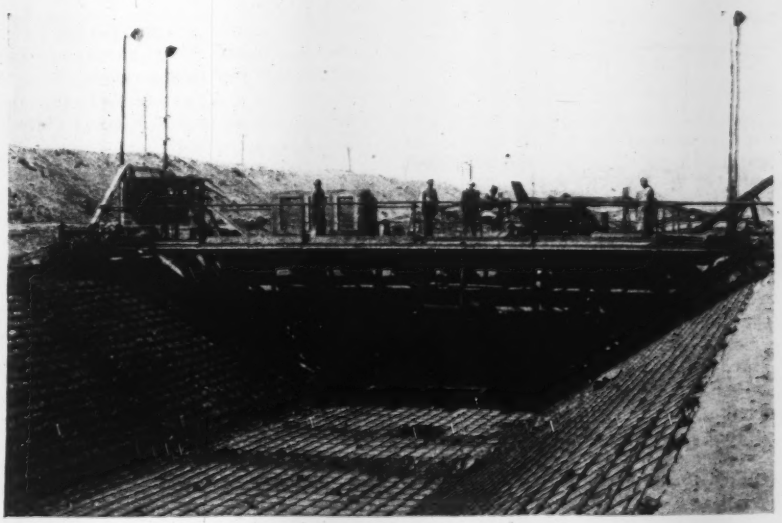


FIG. 4—AHEAD of the concrete finisher, reinforcing steel is placed on concrete chairs, and the earth surface is thoroughly wet down with a hose.

Concrete placement simplified

As originally planned by the District engineers, the open-cut sections of the canal were to have two longitudinal expansion joints, one at the base of each side slope. With the development of the monolithic paver, it was possible to place the entire width of canal lining without longitudinal joints. Accordingly, sufficient steel was specified to take care of temperature changes, and lining for the entire width of the canal was made without longitudinal joints. Transverse expansion joints were put in only at the end of each day's work, at a distance of about 500 ft. apart. The reinforcing steel was laid on concrete chairs on the finished canal subgrade just ahead of the concrete finishing machine. As the lined perimeter of the ditch is 62 ft., the requirement is the equivalent of three 20-ft. highways placed as a single strip with construction joints at 500-ft. intervals.

A technical point in the design of the monolithic paver which was not taken into account in some of the equipment tried experimentally, was the idea of using a 30-ft. wheel base in the end trusses with the entire truss system of the finishing machine so braced that the 6-ft. length of the slip-form proper moved around the canal perimeter as successive chords when traversing a curve. This gave a finished concrete surface quite satisfactory from the hydraulic point of view and made it possible to operate the machines on curves without binding and buckling. These latter difficulties were encountered with forms suspended midway of the 30-ft. wheel base, which thus were pivoted so as to swing around the curves on a true arc—a practical impossibility on a set-up of this sort.

Concrete placement by the monolithic paver made it possible for the men who troweled the surface to have access to their work for initial troweling only a few minutes after the concrete had

left the mixers. Specifications called for a hard-troweled finish equivalent to standard sidewalk construction. Accordingly, two carriages for finishers were supported on the rails alongside the canal. These were light frameworks with longitudinal planks supported close to the bottom and to side slopes, so that the finishers had convenient access to the freshly poured surface without placing any weight upon it. With the monolithic paver moving ahead 1 ft. per min., the customary finishing crew included sixteen men who worked from the carriages, moving them along by hand as the worked advanced.

Concrete mixing was done in two standard road pavers, working in tandem on one canal bank. These machines moved along as the finishing machine advanced and continually were supplied with materials by a fleet of motor trucks. The concrete mixers delivered into a specially designed hopper car operating on a 2-ft. gage track along the forward edge of the monolithic paver and over the apron or continuous chute already mentioned. This car was operated by a 2-hp. geared electric motor; its one operator effectively distributed the entire output of the two concrete mixers.

In fact, progress in placing the concrete lining was limited by the capacity of the two mixers. A mixing time of 1½ min. was specified. The batch used was 1⅛ cu.yd. A day's work, or 500 lin.-ft. of canal, represented a total of 700 cu.yd. placed. As far as the monolithic paver was concerned, it is believed that it could have placed 1,000 cu.yd. of concrete with the same payroll had the facilities for delivering concrete yardage in this quantity been available.

This equipment was designed, manufactured and made ready for operation within 60 days after the contract had been awarded. The initial contract was completed Dec. 1, 1935. In the ensuing 30 days the equipment was moved to an adjoining schedule and completed on both schedules a total of 10½ miles of canal. The total amount of concrete placed by this machine was about 80,000 cu.yd. Of the other methods of placement tried out on the open canal sections of the aqueduct, none succeeded in placing more than 200 cu.yd. of concrete per shift, and all involved longitudinal joints at the bottom of both side slopes as well as numerous transverse joints. For these reasons concrete finishers of design similar to the one described were eventually used on all of the lining schedules.

The subgrader and the monolithic paver were designed, built and patented under the direction of Clyde W. Wood, of Wood & Bevanda, general contractors, Stockton, Calif. The Colorado River Aqueduct is being constructed by the Metropolitan Water District of Southern California, of which Frank E. Weymouth is general manager and chief engineer.

Truss-Shifting Operations Feature Bridge Revamping

Through span of 140 ft. cut in two lengthwise, and halves shifted simultaneously in transverse and longitudinal directions to new position on skewed piers

By G. C. Olsen
Production Manager,
St. Joseph Structural Steel Co., St. Joseph, Mo.

PROGRESSIVE widening and deepening of the West Fork of the Grand River in northwest Missouri during periods of high water caused undercutting of the pile-supported concrete piers and scouring at several wood-pile approach bents of an old bridge on U. S. Highway 169, necessitating its complete reconstruction. One phase of the rebuilding work that was somewhat out of the ordinary involved shifting a 140-ft. through truss span to one side while the old piers were being removed and new ones built and then shifting it back. The work was complicated by the fact that the new piers are skewed at an angle of nearly 45 deg. compared to the original piers. This necessitated cutting the trusses of the span apart as the span was shifted back and moving them lengthwise as well as sideways. Special falsework and careful erection procedure were required.

The old structure consisted of the single 140-ft. through truss span and several I-beam approach spans supported on creosoted pile bents on 20-ft. centers. The new bridge as designed by the bridge department of the Missouri State Highway Commission is made up of two 120-ft. through truss approach spans and the old 140-ft. span changed from rectangular to single panel skewed ends.

Temporary support of old span

The first operation consisted of driving two clusters of falsework piling upstream to support the 140-ft. span in its temporary location. The span was then moved 39½ ft. from its original position by sliding it over greased tracks, each made up of two 18-in. I-beams borrowed from the old approach spans and tied together with channel separators. These tracks extended almost the full length of the old piers and were carried across the falsework bents. Steel angles were clamped to the upper flanges of each track as supports for small mechanical jacks that were used to move the span. A pulling jack was also attached at each outer bent of falsework to aid in the shifting. On the span the jacks were directed against 2-in. steel plates, which had been substituted for the cast-steel bolster and rocker bearings, to carry the span while it was being revamped. The estimated weight of the steel span with the timber deck removed was 75 tons.

The old span remained on falsework from June 10 to August 26, during which period the river rose twice and deposited a quantity of brush and logs against one of the bents, tearing away a portion of the deflector pile bracing but otherwise resulting in no damage.

Shifting the span back

Upon completion of the new piers the 140-ft. span was shifted part way back over the original tracks to a location such that one end of the south truss was over the east pier and the other end was a few inches from the west pier, as shown in Fig. 1. With the span in this position, preparations were made to cut the south truss free from the rest of the structure.

At five of the six upper-chord panel points, oak piles with 20x10-in. planks spiked to the under side to provide a flat surface were laid from truss to truss. Then at the south truss a dolly consisting of two 1½-in. diameter steel rollers held in a steel frame was inserted under each timber (Fig. 2). To permit free rolling of the dollies, two lines of 2½x½-in. bars were laid continuously along the top chord adjacent to the outer rows or rivets.

Cables were used to attach the cross-timbers to the north truss and the sway and upper-chord lateral braces to the timbers. Each of five intermediate-floor beams was then suspended from a cross-timber at a point close to the south truss by double cables ½ in. in diameter (Fig. 2).

All rivets connecting the south truss to the rest of the structure were then removed, and the truss was shifted some 14½ in. south, placing it in the position marked "Center-line truss after cutting free" on Fig. 1.

Tracks B (Fig. 1), of two 18-in. I-beams, were then erected with the outer ends resting on the south bents of falsework and inner ends centered over north truss bearing points on the piers. Tracks C were next placed on the piers and extending past the truss bearing points at the south end. The four bearing plates supporting the trusses were turned so that the outer edge of each was as nearly as possible perpendicular to the center line of the tracks over which the trusses were to travel.

Cable guys, with their lower ends attached to north truss verticals near the lower chord and their upper ends attached near the tops of the south truss verticals at adjacent panel points west, were then provided to prevent overturning. A long turnbuckle was attached to each guy for take-up. To prevent sway, steel angles were clamped in pairs to each cross-timber, with the downstanding legs barely clearing the edges of the south truss coverplate (Fig. 2).

After jacking angles had been clamped to the top flanges of tracks B and C, shifting was again undertaken, using the small jacks; each truss moved independently of the other, the north truss over tracks B and the south over tracks C. By careful observation and occasional measurement the efforts of the men working the jacks were so timed that the south truss closely maintained its original distance from the balance of the structure throughout the shifting.

The layout described permitted the simultaneous shifting of the entire span in transverse as well as longitudinal direction, the south truss traveling southeast over the piers and the rest of the structure traveling southwest. The dolly-supported timbers on the south truss rolled along the bar tracks with only a little help from a workman with a crowbar who rode on the truss during the shift.

Because of sloping end posts it was not practicable to support the east end floor beam and the first intermediate floorbeam on the west from cross-timbers. A single pile therefore was driven near each pier, and a 12x12-in. timber was laid from pier to pile. The south ends of the two floorbeams were mounted on roller dollies and carried to the piers over the timbers. The entire shifting operation, after the south truss had been cut free, required about twelve hours, using a gang of eight men.

The west end floorbeam, west panel of stringers and both portals were removed prior to final shifting. The old sway braces were removed, and new ones affording increased underclearance were erected, after shifting was completed. New skewed-end floorbeams, end panel-stringers, skewed portals and expansion devices comprised the rest of the new steel required for the old span. Most of the old floorbeams were reconnected to the south truss with their original connection angles, but at the west end of the south truss new angles had to be provided, as the spacing of holes did not match.

The contract to revamp the old span and erect the new was taken at a time when prices were extremely low, and due largely to the limited funds available more attention than usual was devoted to planning. Results justified the preliminary work.

A feature of the reconstruction, not handled by the steel contractor, was the relaying of the original creosoted ties and floor plank on the old center span, which had not been designed to carry a concrete slab. Ties and floor plank were both dressed where necessary, to provide a smooth flat surface. Asphalt planks 1 in. thick were nailed to the floor as a wearing surface. The floor of new approach spans is of concrete crowned 1 in. A gradual flattening of the crown at the river ends of the approach spans, however, provides a surface such that the motorist fails to notice the transition.

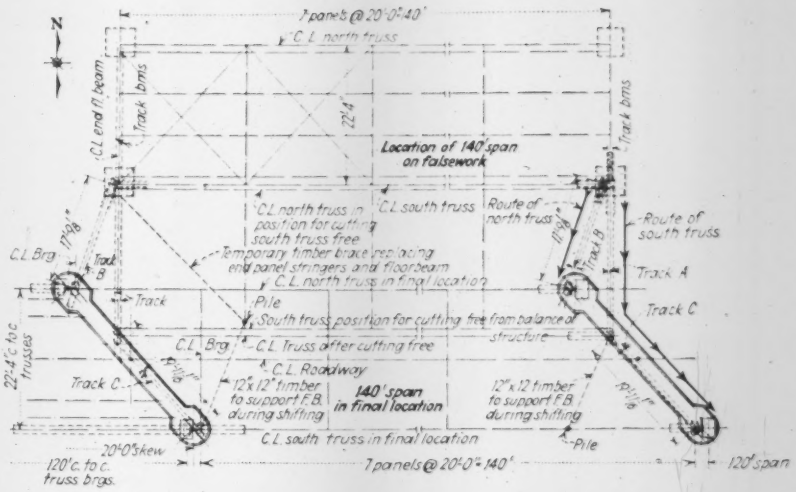

N
7 panels @ 20'-0"=140'
C.L. north truss
C.L. end fl. beam
Track brms
22'-4"
Location of 140' span on falsework
C.L. north truss in position for cutting south truss free
C.L. south truss
Route of north truss
Route of south truss
Temporary timber brace replacing end panel stringers and floorbeam
C.L. north truss in final location
C.L. Brg.
Track B
Track A
Track C
Pile
South truss position for cutting free from balance of structure
C.L. Truss after cutting free
C.L. Roadway
22'-4" C to C trusses
12"x12" timber to support F.B. during shifting
140' span in final location
C.L. south truss in final location
20°-0" skew
120' c. to c. truss brgs.
7 panels @ 20'-0"=140'
120' span

FIG. 1—SHIFTING PROCEDURE and falsework used in converting a 140-ft.-span through truss from rectangular to skewed ends.

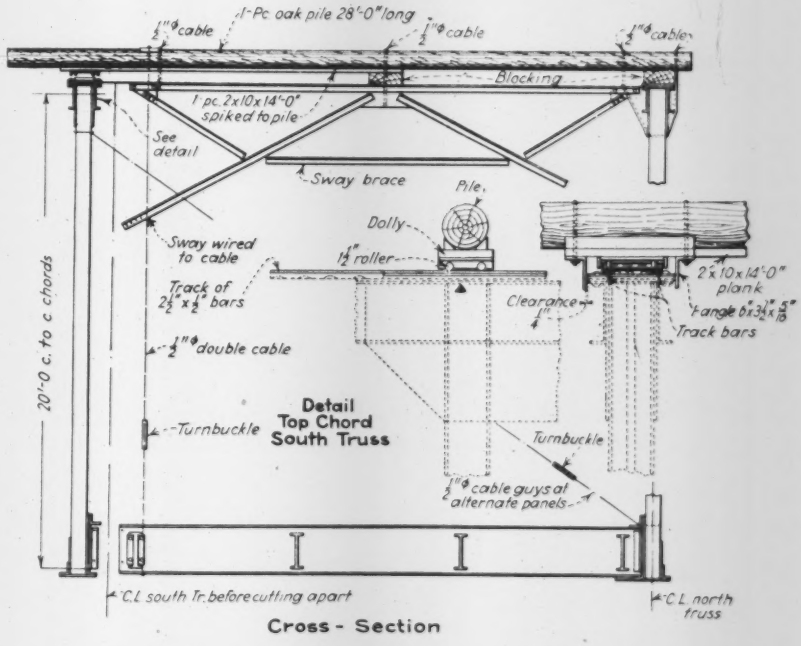


FIG. 2—BY SEPARATING the south truss from the remainder of the span the two halves were shifted lengthwise in opposite directions simultaneously. Connection between the two halves was maintained by roller dollies riding on the south truss top chord and attached to timbers that were fastened across the top of the other half of the structure.

The new bridge was designed under the general supervision of T. H. Cutler, chief engineer, and N. R. Sack, engineer of bridges, Missouri state highway department.

L. M. Hoskins, assistant division engineer, was in charge of the highway department's field force. All new steel was furnished and erected, and revamping of the old span was done by the St. Joseph Structural Steel Co., St. Joseph, Mo., under direction of the writer.

Reducing Secondary Stresses in High Trussed Bents

Design and erection practices used for the framing of new Kress store in New York, which involves two-story trusses of special split-gusset type on a 100-ft. span carrying a suspended floor

By Elwyn E. Seelye
Consulting Engineer, New York, N. Y.

THE NEW STORE of S. H. Kress & Co., at 39th St. and Fifth Ave., New York City, is unique in that the entire street floor, 100 ft. wide and 150 ft. long, is free of interior columns. Over this wide span is superimposed the equivalent of a ten-story building designed for warehouse live loads. An especially heavy headhouse is also included.

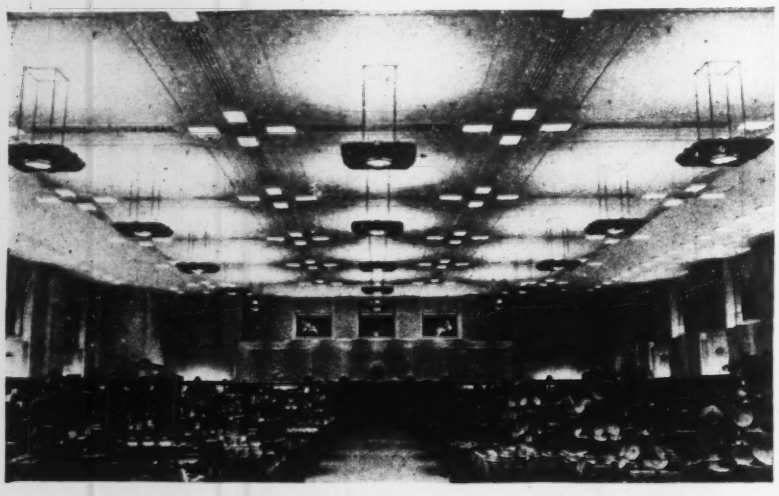


FIG. 1—COLUMNLESS STREET FLOOR of the new S. H. Kress store in New York, made possible by trussed bents of 100-ft. span which carry the upper part of the building and a suspended second floor.

This wide clear first story is accomplished by a series of transverse bents, each consisting of a two-story truss supported on a pair of columns about 50 ft. high. The design of these bents, involving unusually heavy trusses on high columns without X- or kneebracing on account of architectural limitations, presented certain unusual problems such as the question of lateral stiffness, the effect on the floors above of the deflection and elongation of the truss during the application of the dead and live loads, and the secondary stress induced in the columns and trusses by this loading.

In Fig. 3 is shown the outline of a typical bent, together with the direct stresses and loads. It will be noted that all columns rise 50 ft. to the bottom chord of the trusses, which extend from the third to the fifth floors. The second floor is suspended from the trusses.

While the structure is only about 200 ft. high, it was necessary to provide lateral stability, and for this purpose a 20-lb. per sq.ft. wind pressure was assumed from 100 ft. above the street upward. Using this value of wind load, an arbitrary limit for deflection of 1 ft. in 750 ft. was assumed, and the deflections were computed. These deflections are indicated in Fig. 3. The columns were assumed to be fixed at the basement level, and the first floor was considered only as a horizontal tie, although in carrying out the design considerable portal stiffness was added to the first-floor columns and the girders. Preliminary calculations showed that the desired degree of stiffness of the bents could not be attained without portal stiffness at the suspended second floor. This was supplied by the latticed girders. The second floor, being suspended, did not in itself add to the stiffness.

The deflections and also the secondary stresses were determined by means of analysis by the elastic theory and cross-checked by separate methods. In general, the two methods used were moment distribution checked by moment area based on approximate assumptions of end fixity for the main supporting columns. The nature of the structure gave rise to some very interesting problems in indeterminate structures. These

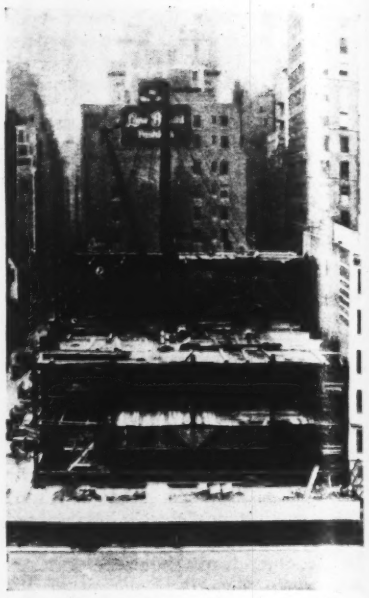


FIG. 2—TRUSS ERECTION on the S. H. Kress store. The building is 100 ft. wide and 150 ft. long.

computations were in charge of J. C. Goldstein, of the writer's organization.

Split-gusset type trusses

The columns supporting the trusses were made as deep as architectural limitations would permit, to provide the stiffest possible section. The truss members themselves are rolled sections with coverplates as required, giving the greatest economy of space as well as economy of fabrication.

Before selection of this type an alternate design was made, using box-section members, whose main advantage over rolled sections is that they permit the majority of the gusset rivets to act in double shear; with rolled-section members the gusset rivets are in single shear, which is apt to result in very large gussets.

One method to eliminate this condition is to separate the coverplates on the rolled sections by spacers, permitting the gusset to be entered between the rolled section and the coverplate. This method, however, was not used, since it would have considerably increased the width of the trusses, which would then occupy more usable space in the trussed stories. Instead, a split-gusset type of design was adopted (Fig. 4) in which the larger gusset enters in the plane of the inner coverplates, the outside (or smaller gusset) enters in the plane of the middle cover, and the outer cover extends full length outside both gussets. The clearance of the entering slot (over and above the thickness of the gussets), which was allowed for erection purposes, was $\frac{1}{8}$ in. This arrangement, which permits a large percentage of the gusset rivets to work in double shear,

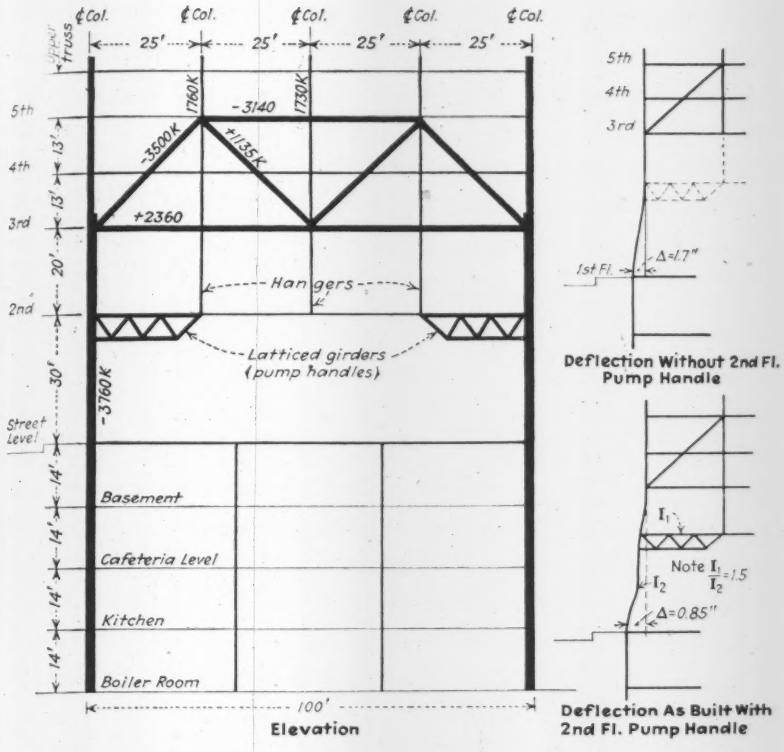


FIG. 3—ELEVATION, stresses and wind-load deflections of the bents. Latticed girders in suspended second floor reduce column deflections one-half.

was originated by H. C. Lamb, of the writer's firm.

The column over the hip joint rests directly on the milled edges of the gussets, which permits an economy in the size of the first vertical over the practice which would have extended the vertical through between the gussets and required a large number of rivets to take its load. The latter practice would also have lengthened the hip gussets because it would have prevented carrying the top chord to and past the vertical column center line.

In the same way the heel-joint gusset was milled on its bottom edge and bears directly on the web plates of the main column section, again reducing the direct load to be carried by rivets in shear. This milling requires accuracy in shop work and was facilitated by the fact that these trusses were pre-erected by the fabricator. The erection experience proved the accuracy of the fabrication and the general design, since very little shimming was required for the milled bearings, and the truss members were placed with great facility.

Secondary stresses

If the bent, including the columns, the trusses and the suspended second floor with its latticed girders, had been rigidly riveted up before any load was placed upon it, the secondary moments, due to live and dead load, would have been as shown in Fig. 5. The maximum combined direct and indirect stress occurs at the top of the column, which would in this case approximate a total of 25,000 lb. per sq.in., which with wind would amount to 28,000 lb. per sq.in. and was considered too high for safety.

It is sometimes argued that secondary stresses are not dangerous because after the material passes the yield point the structure deforms and the secondary stress disappears. However, a steel column tested to failure usually exhibits a local flange buckling, and if secondary stresses should be combined with a local flaw in the material there is a possibility that such a local failure might occur simultaneously with the relief of the secondary stress. For this reason it was considered important to reduce some of the secondary stresses in the Kress trusses.

Two other considerations strengthened the opinion that secondary stresses needed attention. In the first place there would be a high tensile stress across the second floor due to the restraint of the column at this point while its top was being spread by the lengthening of the lower chord and was being rotated due to the movement of the end joint of the truss.

There was also the condition that while the lower chords of the trusses lengthened and the upper chord shortened under loading, the length of the end bays, which did not contain trusses, re-

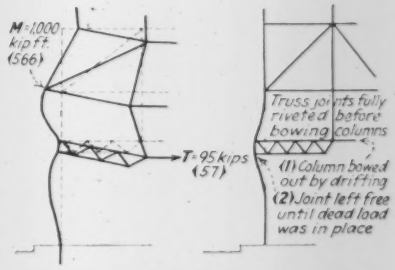

M=1,000 kip ft (566)
T=95 kips (57)
Truss joints fully riveted before bowing columns
(1) Column bowed out by drifting
(2) Joint left free until dead load was in place

FIG. 5—REDUCTION of secondary stresses by finesse in loading. View at left shows distortions and stresses if system is entirely riveted before dead load comes on. Figures in parentheses are for the condition as built and shown at the right.

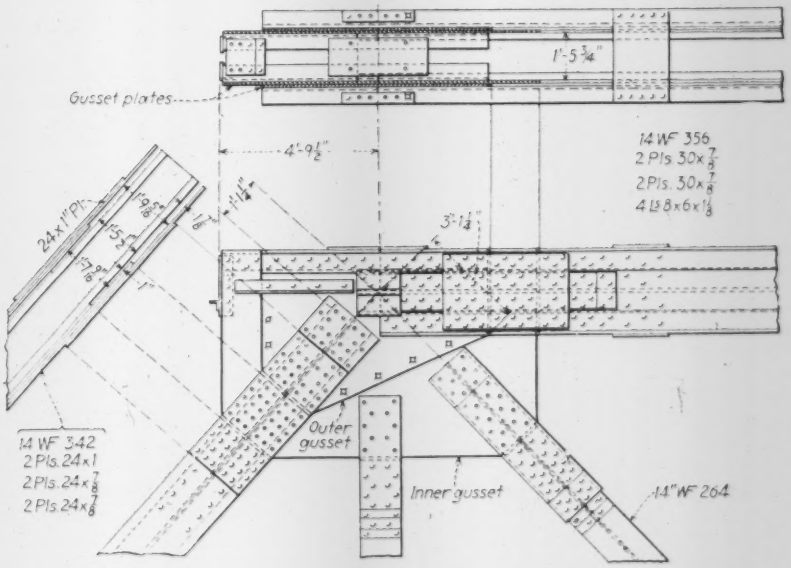


FIG. 4—HIP JOINT of trusses. The "split-gusset" design permits use of double shear rivets with rolled section members.

mained constant. This, it was felt, might produce crippling stresses in the concrete floor slabs, which are made of two-way reinforced slag block and are especially rigid. That this condition needed special attention was brought home to the writer on account of a previous investigation of raftering cracks in reinforced-concrete floor slabs at the truss-chord levels of a bank and office building of somewhat similar design.

These conditions were met in the following manner: The latticed girders in the second floor, which may be likened to pump handles, were fabricated with rivet holes offset, so that when these holes were drifted to a true position the columns would be spread, setting up a compression in the second-floor system and a bending in the column, both in reverse to that which would be induced by the normal deflection of the truss. It was, of course, necessary to rivet up the truss and heel joint solidly before the columns were spread out at the second floor, and this also had to be done before the dead load of the structure was placed.

The latticed pump handles on the second floor were another source of secondary stress since their outer ends, moving down under truss deflections, would cause a bending in the main wall columns. To meet this situation, the bottom chords of the pump handles were left free from the column until the dead load was in place, after which the connection was made rigid. While the live load will induce some secondary stress at this point, a reduction in the secondary stresses of about one-half was affected, keeping the bent safe from extreme high stresses due to a combination of secondary and direct stresses. The reduced secondary stresses are shown in parentheses in Fig. 5.

The stresses in the floor systems were reduced by the omission of the floor in the end panels until the dead load was in place. This again was a compromise, as the live-load stresses would of course cause some distortion, but the method has evidently proved effective, since no cracks have occurred in the floors to date.

The architect of this structure was Edward F. Sibbert; the builder was Barr, Irons & Lane, and the steel contractor Post & McCord, Inc., all of New York.

Shaky Dam Tied Down with Steel Cables

Vertical anchor cables extending through the masonry from crest to foundation restore wall strength of the weak cross-section of Cheurfas Dam in Algeria

A NOVEL METHOD of increasing the strength of a laterally weak masonry dam section was recently devised by A. Coyne in repairing two irrigation reservoir dams in Algeria. In one case the crest section of the dam had been torn off by a flood and was to be replaced, and in the other the operation was entirely a precautionary measure to prevent possible failure of a dam of insufficient cross-section. In both dams the method was to drill holes in the masonry from crest to deep foundation, insert steel cables in the holes and seal them into the foundation, and then put the cables under great tension and hold them in tension by a tightening anchor head bearing on the crest of the dam.

The anchoring operation at each dam is indicated by Figs. 1 and 2. In the Fergoug operation, it will be observed, the new crest masonry was merely tied down to the old base masonry, but at Cheurfas the full masonry section was tied down to the ground strata. As the two operations are similar and that at Cheurfas was the largest and the first to be finished, it alone is described.

The Cheurfas Dam was constructed in 1882 to the cross-section shown by Fig. 1, with a maximum height of about 107 ft. Three years after completion, the right abutment, including a part of the dam, was washed out by a flood. To provide a safer abutment, a new wall of the same gravity section was added at an angle of about 128 deg. This virtually doubled the crest length of the dam and made it V-shaped in plan, with the tip of the V pointing downstream. The failure of a neighboring dam (Fergoug Dam) in the flood of November, 1927, brought about an investigation which pronounced the Cheurfas Dam unsafe on the following counts: (1) insufficient cross-section, causing tension in the masonry when the reservoir is full; (2) inadequate spillway capacity; (3) weak anchorage; (4) seepage along the abutments; and (5) erosion at the toe of the dam.

The critical problem was to strengthen the weak cross-section, and the plan devised by Mr. Coyne was to charge the crest of the dam with vertical loads derived from the foundation rock.

Vertical holes, 10 in. in diameter, spaced about 13 ft. apart, were drilled through the body of the dam and to a depth of 72 to 80 ft. into the limestone, sandstone and marl beneath (Fig. 1). A cable, consisting of 630 wires about $\frac{1}{8}$ in. in diameter, made of special galvanized steel, was lowered into each of the holes, and its lower end was sealed in the rock with cement grout. The upper end of each cable was secured in an individual concrete block ("capstan block") set on the crest of the dam and heavily reinforced with hoops and bars. Each cable was then prestressed to 1,100 tons in tension (practically 115,000 lb. per sq. in.) by three hydraulic jacks, of 440 tons capacity each, mounted on pumps operating at a maximum pressure of about 5,000 lb. per sq. in. After prestressing was completed, the concrete capstan blocks were blocked on cast-steel chocks.

Having thus increased the weight of the dam by a load of about 84 tons per running foot of crest, the resultant pressure line was moved well within the middle third of the section, permitting a storage level 10 ft. higher than the original full supply level of the reservoir.

Parallel-wire cables

Parallel-wire cables, instead of wire rope, were used for the ties, and their construction was a unique feature of the work. The details are shown by Fig. 3. The requirements for the wire steel were: (1) ultimate tensile strength,

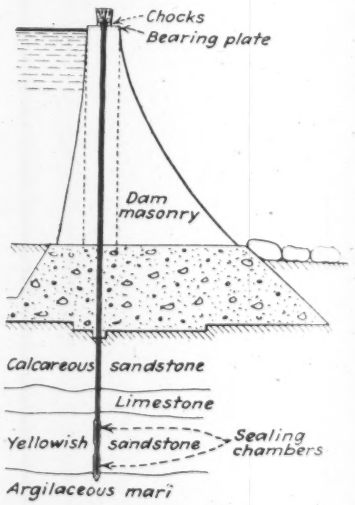


FIG. 1—WEAK DAM SECTION tied down to the foundation rock by steel cables at Cheurfas in Algeria.

156,000 to 185,000 lb. per sq. in.; (2) ultimate elongation of 6 per cent; (3) no cracking when bent six to eight times to an angle of 90 deg. at a radius of 10 cm. (nearly 4 in.); (4) galvanized coating capable of resisting four 1-min. immersions in a 25 per cent solution of copper sulphate in water.

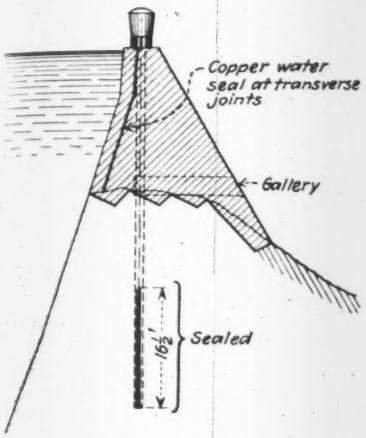


FIG. 2—WIRE CABLES at Fergoug Dam tie new crest section to old base masonry.

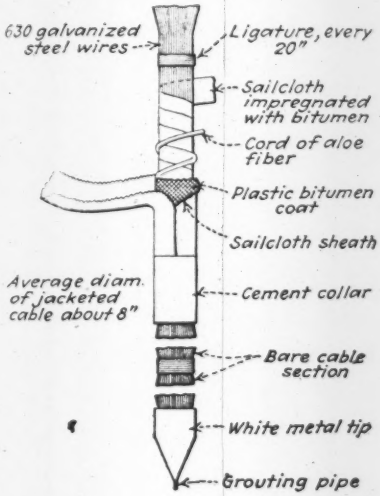


FIG. 3—PARALLEL WIRES of anchor cable were assembled around a grouting pipe and then hooped and sealed into a compact cylinder.

The wires were cut to proper lengths and were stretched to their elastic limit by a special hydraulic press. The cables contained a central core consisting of a 1-in. grouting pipe, around which the 630 bitumen-coated galvanized steel wires were tied with ligatures of annealed steel spaced about 20 in. apart, thus giving the cable a constricted diameter of almost 6 in. The cable was protected against corrosion by a spiral wrapping of sailcloth, impregnated with a patented bituminous compound, over which was placed a jacket of plastic bitumen 2 cm. (0.8 in.) thick and a sailcloth sheath. A spirally wound cord of aloe fiber separates the two sheets of sailcloth. The average diameter of the cable, with the anti-corrosive protection included, was about 8 in.

The lower 23 ft. of the cable had no protective jacket and were fastened with only one ligature at the middle. This caused the cable to buckle above and below the ligature, and the bore hole through the dam was enlarged at these sections to accommodate the swollen diameter of the cable. There was a cement collar just above the bare section of the cable and a cast white metal tip just below it.

The cables were fabricated on traveling towers set on the dam crest over the bore holes. Each tower had three intermediate platforms perforated with 630 holes, one for each wire, arranged in concentric circles. The diameter of the perforated area decreased progressively toward the bore hole.

Placing the cables

With the cable lowered into the bore hole, water was pumped through the core pipe. As clear water began to overflow through the annular space between the cable jacket and the wall of the bore hole, a grout mixture consisting of equal parts of cement and water was injected through the same pipe until the bore hole began to overflow with grout. Thus, only the 23 ft. of bore cable were sealed to the foundation rock; the remainder of the cable was left ungrouted within its protective jacket.

The top end of the cable, which was also bare, was carefully incorporated, wire by wire, in the concrete of the capstan blocks on the crest of the dam, as shown by Fig. 4; special frames were used for the purpose, and the ends of the wires were hooked. The concrete was of selected materials and was cast in metallic forms and vibrated with a special type of "point vibrator" capable of penetrating the close net of reinforcement.

As stated before, the cable is stressed in tension by three 440-ton jacks. Stressing was effected in three stages, first up to a tension of 330 tons, next to 770 tons and finally up to 1,100 tons. This procedure was adopted to minimize shearing stresses in the masonry within the transition zone between anchored and non-anchored dam segments. To check the tension in the cables at future dates, it is proposed to replace the jacks at their original positions and to heave the blocks slightly from their permanent supports.

It is pointed out that the work required most careful execution, for it is exceedingly rare to have so much potential energy concentrated in so little material subjected to such extreme stresses. Each cable has pent up in it about 650,000 ft.-lb. (nearly 24,000,000 ft.-lb. for the entire dam), and the sudden failure of the hold of a cable at either of its ends will cause grave disturbances in the masonry of the dam.

It has been feared that the weaker rock at some points in the dam foundation may gradually yield in time, but since the original tension may be reimposed at any time, it is considered that there is little cause for worry. At any rate, nothing of the kind has happened so far, though some of the anchor cables have been in for over two years.

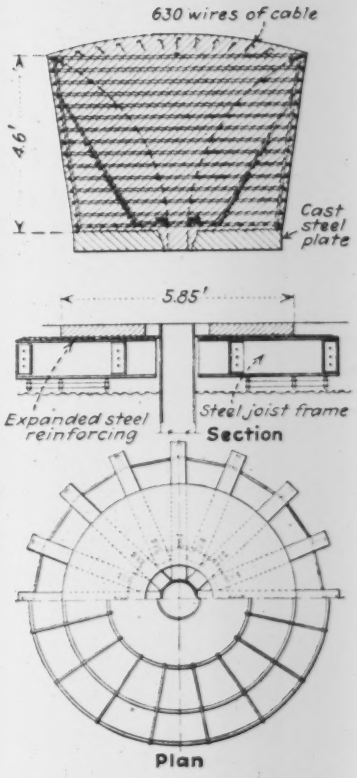


FIG. 4—WIRES at the top of the cable were embedded in a concrete anchor head bearing on the crest of the dam.

It is estimated that the entire work will cost 5,000,000 francs (about $330,000). The most acceptable alternative scheme for the repair of the dam involved extremely delicate foundation operations and would have cost three times as much. Irrigation requirements precluded the draining of the reservoir during the repair of the dam.

The work was executed by the French firm Sondages-Etanchements-Consolidations (Procédés Radio). The information here presented has been taken from articles by Drouhin, in *Annales des Ponts et Chaussées*, August, 1935, and by G. Barcelo, in *Revista de Obras Publicas*, Aug. 1, 1935.

Aluminum Powder in Black-Top Roads

An item in the *Municipal Journal* (England) refers to a report from Germany that powdered aluminum has been added to tar and bituminous surfacing on some roads for the purpose of giving them a high reflecting power with a view both to increasing the safety of night driving and to lowering the temperature of the pavement as a check against softening in hot weather. It is not stated whether the last advantage has materialized.

Current Notes on Sewage Disposal

An analytical summary of recent developments for the engineer, research worker and plant operator

CHANGES IN GAS COMPOSITION

It is well known that the percentages of carbon-dioxide in the gas from Imhoff tanks (20-25 per cent) are usually lower than in the gas from separate sludge-digestion tanks (30-35 per cent), with resulting lower heat values for the latter gas. The explanation has been that sludge liquor containing large quantities of carbon-dioxide is continuously displaced in the Imhoff tank by newly settled sludge and the carbon-dioxide in solution passes out with the effluent; in separate digestion tanks, however, the liquor becomes saturated with gas, and the carbon-dioxide is driven out of solution. Years ago it was shown that when the sewage flow in an Imhoff tank was reversed not only was there a change in the composition of the solids deposited in the different compartments, but there was also a variation in the quality of gas coming from these compartments. This was attributed to changes in biological activities. Hufmann (*Gesundheit Ingenieur*, Dec. 7, 1935), presents results on carbon-dioxide content in Imhoff tank gas before and after reversing flow conditions; he concludes that the rapid change in the composition of gas is not caused by changes in biological conditions but is dut to actual flow phenomena of the sludge in the digestion chamber.

* * *

FILTRATION OF SEWAGE

One of the oldest methods of sewage treatment, sand filtration, is receiving renewed attention. Some time ago, Rudolfs, Brendlen and Carpenter (*Sewage Works Journal*, July, 1935) reported that raw sewage filtered at the rate of 200,000,000 gal. per acre per day, after one hour detention time, produced a greater suspended solids removal and larger biochemical oxygen reduction than plain settling for 2.25 hours. They employed an automatically cleaned magnetite sand filter about 3 in. in depth. Recently Mahr (*Gesundheit Ingenieur*, No. 59, p. 8, 1936) described results obtained with rapid sand filters, using a coarse sand (diameter 2 to 3 mm.) on a raw sewage containing much industrial waste, fats, etc. The filter was used preceding an activated-sludge plant, and it took the place of settling tanks. Experiments with different depths of sand showed that about 30 in. was the optimium thickness when the coarse sand was used. The frequency of backwashing depended upon the size of the sand; with the coarser sand about 22 gal. of sewage per sq.ft. could be filtered before washing became necessary. Washing was accomplished with air (few minutes) and water (about 20 min.), using from 1 to 6 per cent of the filtrate. No difficulties with filtering, backwashing, odors or deterioration of the effluent were encountered even during the warm summer months. The bottom of the filter should be ridge and furrow, the furrows filled with coarse material and the underdrain covered with stone balls. The use of sand filters as preliminary treatment for activated sludge is quite novel, but it should be stated that in this case the sewage treated contained large quantities of iron, which caused partial coagulation, and this undoubtedly was an important factor.

* * *

VEHICLE OPERATION WITH SEWAGE GAS

Utilization of gas produced by the digestion of sewage solids for power production, heating and laboratory use, has been practiced in many places. The use of compressed sewage gas to drive large trucks is now being widely developed abroad, and Heilmann (*Gesundheit Ingenieur*, Dec. 28, 1935) reports that there are at present about 100 trucks in the Ruhr District of Germany equipped to use this gas for fuel. Tanks containing about 500 cu. ft. of gas at a pressure of approximately 400 lb. are supplied, and with three tanks of this fuel a 5-ton vehicle can travel about 225 miles. The cost of operating this size of truck for about 60 miles, with the compressed sewage gas is about $3.43, as compared with an oil mixture costing $5.97. Necessary changes on an oil-operated motor for the utilization of sewage gas are comparatively simple.

* * *

DECOMPOSITION OF PHENOL WASTES

Phenol compounds discharged into streams disappear more rapidly in summer than in winter because their decomposition is hastened under conditions of increasing temperature. Kalabina (*Zeitschrift Fischerei*, No. 33, p. 295, 1935) has shown by experiment that the rate of destruction of the phenol in a stream with a normal flora and fauna is also determined by the velocity of the flow, so that the polluted zone of a normal stream is in direct relation to its velocity. Traces of phenol are much more difficult to destroy than larger quantities. Fish life is affected more by the presence of traces of naphthalene, gums, cyanide, etc., in the wastes than by the phenol itself.

* * *

AERATED TRICKLING FILTERS

Some years ago the Russian investigator, Stroganoff, reported experiments dealing with the artificial aeration of trickling filters. His work indicated that with filter aeration not only could several times the usual quantity of settled sewage be applied to the bed, but that large volumes of raw sewage could also be handled without difficulty or nuisance. Since then several investigators have either rediscovered or repeated these experiments with varying results. Recently Mahr (*Gesundheit Ingenieur*, Jan. 4, 1936) reported that application of either raw or settled sewage to artificially aerated trickling filters, approximately 10 ft. deep, did not produce satisfactory results. He was unable to apply a load greater than 50 gal. per cu. yd. of filter material.

* * *

TANNERY WASTE TREATMENT

Tannery wastes, especially those containing a chrome content, when mixed with domestic sewage, create a mixture that is exceedingly difficult to treat. Such wastes contain quantities of sodium sulphide, organic wastes (skin and meat rests), tanning extract, chrome alum, and quite frequently arsenic. Experiments made by Strell (*Staetereinigung*, No. 27, pp. 357 and 379, 1935) show that the wastes have a detrimental effect upon bacteria, protozoa and other lower forms of animals, and thereby interfere with biological treatment processes and with the natural self-purification that takes place in streams. Only when a dilution of 1 to 25,000 is employed do the chrome salts lose their effectiveness in destroying organisms that aid purification. On the basis of these facts, it is suggested that only with good working mechanical devices, secondary chemical treatment, and final chlorination can tannery wastes be sufficiently treated to permit their discharge into a stream. Domestic sewage should be kept entirely separate from these wastes.

Professonal Consolidation Plan Moves Forward in Canada

Engineering Institute of Canada at Hamilton meeting adopts resolution looking toward consolidation with the Provincial Professional Association

CONSOLIDATION of the Canadian professional associations of engineers with the Engineering Institute of Canada, a subject of active discussion in Canada for many months past, was endorsed in principle by the members of the institute assembled in Hamilton, Ont., Feb. 5-7, and machinery was set in motion to bring about such consolidation or confederation at the earliest possible date. Thus the meeting proved as important to the profession as its significance as a jubilee gathering might suggest. Although the fiftieth annual meeting of the institute, it was not the official semi-centennial, that celebration being tentatively scheduled for June, 1937, the fiftieth anniversary of the incorporation of the Canadian Society of Civil Engineers, predecessor of the institute.

The meeting was notable in that business and professional affairs eclipsed the technical sessions, though the technical sessions also developed unusual significance; it was notable also in the fact that all the provinces except Prince Edward Island were represented by an unusual number of prominent engineers.

New officers

Ernest A. Cleveland, chief commissioner of the Greater Vancouver Water District, was elected president of the institute for 1936, as noted in our issue last week, to succeed F. A. Gaby. New vice-presidents elected were as follows: R. L. Dobbin, Peterborough, Ont.; A. B. Normandin, Quebec; and H. W. McKiel, Sackville, Nova Scotia.

Committee reports presented at the meeting were generally encouraging, especially that of the committee on unemployment, which recommended that it be discontinued in view of the general improvement in conditions affecting employment. The committee noted that some unemployment of engineers still persists, the employment bureau of the institute having 280 members still registered, about 130 of whom have temporary employment of some kind.

The membership of the institute increased from 3,764 to 4,133 during the past year. This increase to a large extent is explained by the return to active membership of many non-active members who had been put in this special classification because their economic position had been seriously affected by the depression. There are still 383 members on the non-active list.

The Sir John Kennedy Medal, highest award of the institute, was presented to A. H. Harkness, consulting engineer, Toronto, and the Gzowski Medal was awarded to P. L. Pratley for his paper on the substructure of the reconstructed Second Narrows Bridge (Vancouver) presented during the year. The Past Presidents' Prize went to J. B. deHart; and Students' and Juniors' prizes were awarded to Z. Levington, S. T. Fisher, Y. Roma Tassé and F. L. Black.

Economic subjects emphasized

The retiring address of F. A. Gaby was a reflection of the increasing attention being paid by engineers to public problems. Although we live in an age of power, said Dr. Gaby, there exist obstacles to the fullest utilization of that available power, and he suggested that technical progress had outrun the development of administrative technique. This led to a consideration of the need for engineers to devote more attention to the economic side of engineering works, and also to general economic problems which, said the speaker, cannot be considered other than internationally. A broader educational system for engineers was a consequent suggestion and the development of those qualities which will fit engineers to utilize their specialized knowledge in administration problems.

That the Engineering Institute of Canada was the logical body for the general consideration of Canadian economic problems was a further suggestion of Dr. Gaby's, and one which was reflected in other parts of the meeting. During discussion of the report of the committee on western water problems, for example, it was recalled that the last annual meeting had included the institute's first important excursion into such national problems as the drought in western Canada, as it then existed. Appreciative note was taken by this meeting of the subsequent actions of the Dominion government, which have left little work for the institute committee to do, but some criticism was voiced at the fact that the institute committee was not one with headquarters and personnel in the western part of Canada, which is the affected area.

Public affairs were also mentioned at the formal luncheon which initiated the social functions associated with the meeting, the mayor of the city of Hamilton extending an official welcome and adding to this a plea for closer cooperation between engineers and administrators.

Transportation

Transportation was the new national problem receiving specific attention from the meeting, the first general technical session being devoted to a symposium of papers dealing with various aspects of the general subject. First came a paper entitled "Advance through Adversity" by L. K. Sillcox, vice-president of the New York Air Brake Co., which was a review of the remarkable development in recent years of the design of railroad equipment, centered on the use of the internal-combustion engine, the growing applications of streamlining, and improved braking and control facilities. Based on the thesis that facilities create traffic, the paper presented an optimistic forecast for railroad traffic, and stated with forceful clarity that transportation in the future must be coordinated, each participant prospering by virtue of performing the essential service which it can best accommodate. Two papers of an essentially factual basis were included in the symposium: "The World's Airway System" by J. A. Wilson, controller of civil aviation of the Department of National Defence, Ottawa, was a comprehensive review of the present air services of the world; and "An Outline of Commerce on the Great Lakes and the St. Lawrence," by C. G. Moon of St. Catherines, Ont., provided in a convenient form a statistical summary of the use to which the international waterways of the Great Lakes and St. Lawrence River are now put.

Finally came two papers dealing with highway transportation: "Highway and Passenger Transportation" and "Motor Truck Transportation," the authors being, respectively, A. H. Foster, president of the Ontario Association of Motor Coach Operators, and W. H. Male, director of the Automotive Association of Ontario, both of Toronto, Ont. The two papers were complementary, and similar in conclusion. Each traced the development of the use of the internal-combustion vehicle and of the roads on which they run, emphasizing the respective peculiarities of the growth of motor coach and motor truck. Both papers suggested that the effect of the motor vehicle on railway traffic, in Canada at least, had been negligible, advancing statistics to prove the cases thus advanced. Both papers suggested that no further regulatory measures were at present necessary. It was stated very definitely in the first paper that highway users (and especially the motor-coach operator) were paying more than their fair share of highway costs.

The annual banquet of the institute

was held immediately after the session at which these papers were considered, the address being given by Sir Edward Beatty, president of the Canadian Pacific Ry. Although prepared independently, Mr. Beatty's paper constituted almost a direct reply to the two papers, just noted.

This address already has created considerable interest in Canada, the more especially since Sir Edward emphasized that he was trying to approach the problem of road and rail transport from the general point of view, and not solely from that of the railroads. Sir Edward prefaced his speech with reference to the work on this subject which had been done by the retiring president, F. A. Gaby, in his capacity as assistant to the president of the C.P.R.

Another plea for the engineering profession to broaden its outlook and consider economic problems of national import was made by Mr. Beatty, the speaker stating that his work daily demonstrated to him the importance of engineering work in all such problems and suggesting that engineers, by reason of their training, were especially fitted to perform such important work. That the railroads had been "asleep at the switch" with regard to the growth of road traffic was an assertion vigorously denied by Mr. Beatty, as also the suggestion that road transport had not interfered seriously with rail traffic, the nature and not the volume of traffic diverted from rail to road being the basis of such refutation, the "cream of the traffic" being that alone taken by road vehicles. In dealing with highway costs, current figures were seriously questioned on the ground that *provincial* highway costs alone were quoted, municipal road expenditures not being included, despite the fact that cities are the terminals of all road routes. Finally, the general transportation system of Canada was reviewed, and it was suggested that not only the railroads but all other major forms of public transport were far from being financially well established, if proper accounting were considered. Inland waterways were considered in this connection, and while paying tribute to the engineering features of the Welland Canal, Mr. Beatty questioned its economic justification. Finally, the fact that traffic on inland waterways of Canada is carried free of all tolls was mentioned, and the suggestion was advanced that the time may be coming when this position should be again reviewed, as a national necessity.

Transport committee proposed

As an outcome of the discussion of transportation, the council of the institute was asked to set up at once a fact-finding committee to consider as fully as possible the general subject of "Transportation in Canada," subcommittees for considerations of the several branches of transport being also suggested. It was announced that C. D. Howe, Minister of Railways, Canals and Marine in the federal government and a member of the institute, had stated that he would not only approve but would welcome the setting up of such a committee.

Consolidation

The program of the meeting was extended to include Wednesday especially for the discussion of the report of the committee on consolidation, appointed at the last annual meeting of the institute (*ENR*, Feb. 21, 1935, p. 293). Discussion of the report started at 10 a.m. and was concluded at 11:20 p.m. Attendance throughout the whole of this time was a record for the meeting (apart from the social functions), and the discussion was almost consistently on a high level.

For historical background it should be stated that soon after the Canadian Society of Civil Engineers became the Engineering Institute of Canada in 1918, a movement was begun to obtain some degree of legal standing for the profession of engineering in Canada. Owing to the terms of Canada's constitution, it was necessary to approach the matter through the provincial legislatures, separate provincial professional associations of engineers being constituted in each of the provinces except the small agricultural province of Prince Edward Island. Subsequently, steps were taken to correlate the activities of these associations with the institute which had fostered them, but delays occurred and the associations grew in stature, especially those of Quebec and British Columbia.

At later dates various committees were appointed to consider the relation of the associations with the institute, culminating in one which reported in 1930. Following this, overtures were made by the institute to the provincial associations with a view to the formation of a joint committee, but objection was raised to the institute's being represented on any such national committee, on the grounds that only the associations should so combine in the first place. To facilitate progress, the council of the institute agreed to this suggestion, and a committee of eight (one member from each provincial association) was the ultimate outcome. This committee met in Montreal in February, 1933, and drew up a proposed constitution for a "Dominion Council" of the associations, to take the place of the committee and continue its work. A further step was the appointment at the annual meeting last year of an institute committee on consolidation under the chairmanship of Gordon McL. Pitts "to develop the possibilities of consolidation of the engineering profession in Canada." This committee has held fourteen meetings in the past year and produced a unanimous report, which had been circulated to the profession before the start of the Hamilton meeting.

The report of the committee was based on replies to a broad questionnaire submitted to the members of the institute to all branches of the institute and to the provincial associations which cooperated in the work by giving the questionnaire their attention. Based on all this assembled information, the committee concluded that "An overwhelming majority of the profession is in favor of consolidation . . . and are of the opinion that, ultimately at least, the corporate membership of the association and the national body should be identical . . . believing also that the Engineering Institute should be recognized and accepted as the national body of the profession." Analyzing the present situation, the committee suggested that three classes of members had to be considered, those in the E.I.C. and the provincial association, those in the E.I.C. only, and those in the associations only (the latter being now quite a large group).

Recognizing the existence of these three classes and making suitable provision for their retention on the basis of the engineers at present so grouped (i.e., leaving out of consideration any coercion of engineers of either of the second two classes into the body to which they do not presently belong) the committee was able to recommend unanimously the following steps:

> 1. That . . . the Engineering Institute of Canada take immediate steps to put [consolidation] into effect with those provincial professional associations with whom satisfactory arrangements can be made.
>
> 2. That the Engineering Institute agree to accept as qualification for admission to membership in the institute the standard of membership requirement of the provincial professional associations or corporations, and that when the engineers of a province come into consolidation, only members of the provincial professional association or corporation of such province shall thereafter be accepted into membership in the institute from that province.

Seven other recommendations followed, the most important of which referred to the use of provincial divisions for administration of the profession in the future in association with national headquarters.

Little criticism of the report was voiced, practically all speakers expressing their appreciation of the work it represented and the information that it had assembled. The discussion gradually developed a confirmation of the generally expressed wish of the profession to see consolidation effected in some way, details of procedure, and the immediate basis on which action could be taken being the matters most often in question.

Two general courses of action in effecting consolidation, advanced by those who agreed that action of some sort must be taken, provided the only subject on which extended discussion took place. The committee recommended that the E.I.C. should be the national

body coordinating the work of all provincial associations. The other view held that the Dominion Council should be this national body, the activities of the institute and associations being kept separate although in harmony. In answer to this view, it was stated that the profession in the Dominion could not support two national engineering bodies; also that only by having the institution and the associations consolidated could professional matters be adequately dealt with and the profession truly integrated.

Shortly before midnight the following motion, prepared by a small committee, was unanimously adopted by the meeting:

> That the report of the Committee on Consolidation be adopted, in principle as a progress report, also that the Committee on Consolidation be continued, with instructions to add to their number two members of the Dominion Council of the Associations, and be empowered to add further to their number providing such additional members be approved by Council, and that Council and the Committee shall cooperate for the speedy consummation of consolidation, cooperation, or confederation throughout the Dominion.

It is understood that an informal joint meeting of the Institute Committee with the Dominion Council of the Associations was held later, during the gathering at Hamilton, with most satisfactory results.

Technical sessions

Of chief interest to civil engineers in the technical sessions was a paper by P. L. Pratley, consulting engineer, Montreal, on the superstructure of the reconstructed Second Narrows Bridge at Vancouver. The reconstruction consisted principally in the installation of a vertical-lift bridge in place of the bascule span. A previous paper by Mr. Pratley on the substructure for the reconstruction was that for which he was awarded the Gzowski Medal.

Refuse Collection and Disposal Analyzed in New York

IMPORTANT CHANGES now taking place in problems and methods of collection and disposal of municipal garbage, ashes and rubbish may mean increased convenience to householders and reduced municipal costs for these services in the near future. A new home disposal device which grinds garbage and flushes it automatically into the house sewer through the kitchen drain may some day eliminate garbage pails and garbage wagons from the streets of cities and villages. The New York State Conference of Mayors, in a recent investigation of the collection and disposal of municipal refuse in 89 New York municipalities, analyzes in detail the implications of this and other devices and emphasizes the constantly changing character of municipal wastes. The comprehensive study of municipal refuse collection and disposal practices was made by Arthur H. Herberger, under the joint auspices of the Mayors Conference and New York University.

Stressing the fact that municipal sanitation administrators must be alert to all new developments, it was pointed out that municipal wastes are not statically fixed materials. There is a gradual change of substance and quantity year by year. For example, the dead horse is now supplanted by the discarded automobile. Even such basic materials as ashes, garbage and rubbish do not remain fixed in composition or quantity. As coal replaced wood, so oil is now competing with coal as a fuel. Modern transportation and refrigeration, by increasing speed of distribution and decreasing costs, have made green vegetables available the year round. Hence, the kind and amount of garbage will be more nearly equal in all months of the year and the quantity increased. The electric refrigerator, however, decreases the amount of garbage by reducing food wastes due to spoilage.

In discussing the changing aspects of refuse collection and disposal, it was indicated that the quantity of ashes resulting from cooking is continually decreasing. In municipalities not served by gas mains, householders are using oil, electric ranges or cylinder gas. With the decrease of the use of coal and wood stoves, however, the quantity of rubbish will increase, for there will be no means of disposing of combustible refuse. Private incinerators in large structures and in private homes will decrease the quantity of garbage and combustible rubbish collected by the municipality. As yet, however, there are few municipalities where such incinerators are sufficient in number to make a noticeable reduction.

Because of the shifting nature of the problem of refuse collection, municipal sanitation officials are urged to keep a complete file of oil burners, gas heaters, private incinerators, home disposal devices and other new developments. These data will aid the municipalities in routing vehicles and determining personnel and time necessary for collection.

One significant development especially advantageous in thickly populated areas is the trend toward joint collection and disposal of municipal refuse by governmental units. This trend appears to be most marked in Nassau, Westchester and Erie Counties.

Summarizing his detailed study of all phases of municipal refuse collection and disposal in New York municipalities, Mr. Herberger comments as follows: "The data received and the first-hand studies made in field trips indicate that the collection and disposal of municipal refuse in New York State is in general being administered in a reasonably thorough and efficient manner. There are, of course, wide variations in problems and practices, but on the whole this survey presents a picture distinctly encouraging to city and village taxpayers."

Seriousness of Termites in Buildings Often Exaggerated

RESEARCH on termites in buildings by Thomas E. Snyder, of the U. S. Bureau of Entomology, was reported on at the Memphis meeting of the American Wood Preservers Association, Jan. 28-30. He discussed methods of detecting the presence of termites in buildings and proper procedure to prevent damage.

"The fact that termites are discovered in a building," stated Dr. Snyder, "is no reason for exaggerated fears on the part of the owner. Investigation has shown that the danger of collapse of any fairly well-constructed building from termite damage alone is extremely small in continental United States." He enumerated the various termite-control tests made by the Bureau of Entomology in different locations and stated: "Each year progress reports are made on these tests, and as yet we have no data to show any reason why the federal specifications for wood preservatives should be changed. These specifications stipulate that where timber must be used in contact with the ground, it should be impregnated with coal-tar creosote; and where it is used above ground and finished or painted after treatment, it should be impregnated with zinc chloride."

A number of cities in the United States have incorporated in their building codes the recommendations of the U. S. Bureau of Entomology for preventing termite damage to the woodwork of buildings. As to treating wood in place, Dr. Snyder claimed that, "Owing to the extent of possible ramifications of subterranean termites in a building that has been infested for some time, and the protection which they have in their burrows concealed in the wood, no control worth while can be obtained by fumigation or spraying. Spraying, even under strong pressure at borings made in eaten timber, is unsatisfactory."

Letters to the Editor

Shallow Concrete Beams

Sir—In view of Professor Richart's and Mr. Bilderbeck's letters (*ENR*, Nov. 21, 1935, p. 722) I would like to make some additional comment on C. B. McCullough's tests (*ENR*, Sept. 19, 1935, p. 406), which I was fortunately privileged to witness.

Regarding the concrete strength, the cylinder strengths tabulated are the average of two cylinders. In the case of the Type 3, 4.60 per cent beam, one of the cylinders broke at 3,250 lb. per sq. in., the other at 3,890 lb. per sq. in. While it is true that the average value of all the cylinders is about 4,000 lb. per sq. in., it is also true that the strength *assumed* for this particular mixture in bridge design in both Oregon and Washington is 3,000 lb. per sq. in. It is customary in bridge design to postulate strengths well below the *average* cylinder strength, and it is on assumed strengths, not on actual, that designs are worked out.

Mr. Bilderbeck's formula, proposed to bring about closer agreement between cylinder and flexural strength, is tantamount to assuming that with straight-line variation of stress, when the concrete fails in flexural compression, the neutral axis is at the plane of the reinforcement. Since tension cracks actually develop above the reinforcing steel in such beams, the formula appears to lack corroboration in the beams.

Mr. Bilderbeck, in questioning whether the flexural strength can be appreciably more than the test-cylinder strengths, comes to the crux of the matter.

It is to be realized always that straight-line variation of stress is an assumption. It is a practical approach to reality; it is workable; its very simplicity gives it a superiority to anything more refined. But it remains an assumption none the less, and to values derived from it must not be attributed the qualities of pure and abstract truth.

When consideration is given to that admirable solid, the standard 6x12-in. concrete test cylinder, it may fairly be asked just what is there about it that its compressive strength should be the precise exact measure of the flexural strength of concrete. Another 6-in. cylinder, made of the same concrete of which the standard cylinder is made but of a different height, would have a different load-carrying capacity and therefore a different unit strength. Even as the tones of a trombone change with its varying extension, so the strength of concrete varies with the height of the cylinder in which it is tested. It is of the size, shape and end conditions of the cylinder that the strength is a function. (See Gonnerman, A.S.T.M. *Proceedings*, 1925, Part 2, p. 237.) There is absolutely nothing about or in the standard 6x12-in. cylinder to make its compressive strength exactly equal to the concrete's flexural strength, which assuredly also must vary somewhat with the size of test specimen, lateral restraint, etc.

That is the great and significant fact of the McCullough tests: the standard cylinder strength was *not* the flexural strength but averaged only 58 per cent of the flexural strength. As Professor Richart points out, a very similar relationship was earlier shown in the Slater-Zipprodt and Slater-Lyse tests.

There is, therefore, no need for change in formulas. The need is for change and increase in permitted working stresses to whatever values will give sane reasonable factors of safety.

The use in bridge design of a 650-lb. working stress with a 4,000-lb. concrete, assumed to be but a 3,000-lb. or weaker concrete, is not so strange a practice as Professor Richart infers. It is fairly common, in fact. If 650 lb. per sq. in. isn't used, then 750 or 800 lb. is. These values are all of the same order of magnitude and result in factors of safety about equally prodigious.

There is need for a thorough examination and revision of all basic design stresses in reinforced concrete: flexure, shear, bond, bearing. About as curious as stresses in flexure are those in shear. There is also need to draw standard specifications so as to encourage controlled and inspected concrete and to penalize careless and uncontrolled work.

HOMER M. HADLEY,
Regional Structural Engineer,
Portland Cement Association.

Seattle, Wash.,
Dec. 15, 1935

Cooperate to Preserve Benchmarks

Sir—This is a plea for the cooperation of engineers in preserving benchmarks, in their own interest as well as that of profession and public.

The United States Coast and Geodetic Survey during the past 65 years has been extending lines of precise levels ("first-order" levels) throughout the country. These first-order lines are spaced at intervals of about 100 miles, while within these areas the leveling is of second-order accuracy. The leveling in the vertical control net now totals slightly over 250,000 miles of lines, with benchmarks set at intervals of several miles on the oldest work, and on the latest leveling about one mile.

This work has established well over 100,000 benchmarks, most of which are marked by properly inscribed metal tablets set in concrete posts, bridge abutments, culvert headwalls and other structures such as buildings, monuments and seawalls.

Frequently new construction or repair to existing structures makes it necessary to destroy these marks, in spite of the fact that every effort has been made to place them where they will be as permanent as posible. This bureau has no funds from which to pay field parties to go about and relocate these marks when they must be moved. The result is that, if these marks are to be preserved for the use of all engineers and surveyors who may have occasion to use them, we must depend on the cooperation of engineers and others throughout the country for assistance in their preservation.

We have worked out a routine method of handling such cases. If engineers who encounter our marks in the course of construction, repair or maintenance operations will cooperate as outlined below, the destruction of useful benchmarks will be very much reduced.

As soon as it becomes known that a mark must be moved, a letter should be sent to the Director, U. S. Coast and Geodetic Survey, Washington, D. C., attention Section of Leveling, stating the necessity for moving the mark and giving its designation. The designation consists of the letters and numbers found to have been stamped with dies on the disk. It is desirable to furnish a rubbing of the disk as well. A rubbing can be made by placing a piece of medium-weight paper over the disk and then rubbing over the paper with a hard pencil to bring out the legend cast in the disk, especially the letters and numbers stamped on it with dies.

Upon receipt of this information, this office will send out a new disk properly stamped to show that it has been reset. Necessary instructions for the establishment of the new mark and the transfer of elevation will also be sent. The proper procedure, in most cases, is to establish the new mark in a safe place nearby and transfer the elevation from the old mark to the new one by means of an engineer's level and rod. The levels should be run in duplicate to avoid the possibility of large errors, and all readings should be made to three decimal places in order to preserve the accuracy of the original elevation.

The old mark should not be disturbed until the observations involved in the transfer have been checked by the observer or the recorder. An assumed elevation for the old mark may be used in the transfer, since what we are primarily concerned with in a case of this sort is the difference in elevation between the old mark and the new one established to replace it.

After the new mark has been established and the elevation transferred to it, the old disk should be broken out and returned to this office in a franked mailing sack which will be supplied for the purpose. A complete report on the action taken, including a description of

the location in which the new mark is established and a copy of the field notes involved in the transfer of elevation, should also be forwarded to this office; a franked envelope will be furnished for this purpose.

The cooperation which individuals and organizations may extend to this office in preserving the benchmarks will be a service not only to this bureau and other government surveying organizations but to anyone who may have occasion to use the marks.

HOWARD S. RAPPLEYE,
Chief, Section of Leveling,
U. S. Coast & Geodetic Survey.

Washington, D. C.,
Feb. 4, 1936.

Engineering Books Needed

Sir—There is a very fine group of students from Afghanistan graduating from the School of Civil Engineering of Cornell University this year, who are going back to their own country to work under the heavy handicap of not having an engineering library of any kind in Afghanistan.

There are probably many engineers in the United States who have files of old engineering periodicals, books no longer used, old editions, etc., who would be glad to donate them for such a purpose. A list of such books and periodicals sent to this library would be used for making up a suitable collection.

The Afghan Minister in London will see to the transportation and to the care of the books as the nucleus of an engineering library, by the Minister of Education at Kabul.

M. H. WALBRIDGE,
Librarian, School of Civil Engineering,
Cornell University.

Ithaca, N. Y.,
Jan. 25, 1936.

Engineers in Construction

Sir—In your report on the annual meeting of the American Society of Civil Engineers in New York, as published in your issue of Jan. 23, 1936, the statement is made: "On a recent nation-wide trip, during which he visited many construction operations, Mr. Ackerman noted a rather unwholesome attitude toward engineers on the contractors' staffs. Such an attitude, he feels, is obstructing progress and is to no one's best interests."

Apparently, my statement was misunderstood by your editorial representative at the meeting and I would like to offer the following correction. My general observations were that on some projects the contractors displayed a disposition not to employ engineers and technical assistance to such an extent as to develop the substantial profits which can be gained thereby in competent advance planning and continuous control of operations. If contractors recognized the benefits of an engineering approach to construction problems, and, of course, if engineers recognized their opportunities in this field and developed themselves with an abundance of sound and practical judgment, progress in the science of construction could be greatly accelerated.

A. J. ACKERMAN,
Tennessee Valley Authority.

Knoxville, Tenn.,
Feb. 8, 1936.

A Veteran Inspecting Engineer

Sir—Many of the older engineers who had occasion to know the late John C. Naegeley, veteran inspecting engineer, feel that his long service to the structural art merits a word of appreciation. His character and work gave him a place of his own in his chosen field of supervision of steel rolling and fabrication.

John Clement Naegeley, born on March 30, 1844, at Ulm, Germany, was educated there and in Pennsylvania schools, and then for twenty years served as engineer in railroad, bridge and locomotive shops. He first was with the Atlantic & Great Western R.R. at Kent, Ohio, then with the Cleveland Bridge and Car Works at Cleveland and the Porter Locomotive Works at Pittsburgh; then in succession with the New York Central, the Boston & Albany and the Cleveland & Akron railroads, and thereafter for six years with the Keystone Bridge Works, Pittsburgh. In 1885 he established his own practice.

I first became acquainted with him in 1901, when he was engaged as chief inspector for the Atlantic Avenue improvement of the Long Island R.R. in Brooklyn. The work here was a grade-separation undertaking of considerable magnitude, involving some 12,000 tons of structural-steel work, including two heavy railroad viaducts with a combined length of about 2½ miles in the streets of Brooklyn. In 1904 he acted as inspector of structural materials for the Hudson & Manhattan R.R. on its Hudson River tunnels, and soon thereafter became chief metal inspector for the Pennsylvania R.R. tunnel improvement in New York. From 1912 to 1916 he was engineer of inspection under Gustav Lindenthal on the Hell Gate Bridge, and still later he was inspector of steelwork for the Delaware River Bridge at Camden, under Ralph Modjeski as chief engineer.

Such men as C. C. Schneider, past president of the American Society of Civil Engineers and for many years chief engineer of the American Bridge Co.; J. Vipond Davies, James Forgie, O. H. Ammann, Ralph Modjeski and Gustav Lindenthal knew and valued Mr. Naegeley's unusual abilities. Thoroughness and conscientious performance were his characteristics in everything that he touched. He was wholly loyal to those by whom he was employed and uncompromising in his insistence on compliance with both the letter and the spirit of the specifications; at the same time he was fair and just in dealing with those who honestly tried to do good work.

Mr. Naegeley lived to the advanced age of 91. He died last April at Maplewood, N. J., where he had lived for some years with a nephew.

J. B. FRENCH,
Consulting Engineer.

New York, N. Y.,
Dec. 18, 1935.

Widths of Highway Lanes

Sir—In the Dec. 19, 1935, issue, are three articles that suggest some comment on roadway widths. One is the Davenport, Iowa, bridge; the second is the non-stop express highway in St. Louis; and the third is the new Mississippi River bridge at New Orleans. On the Davenport bridge the roadway width is only 20 ft. between the curbs, and undoubtedly this is intended to carry two-way traffic. On the St. Louis express highway the engineers are also figuring on lanes of only 10 ft. each; and in the case of the Mississippi River bridge, the lanes are only 9 ft.

We here in Queens, and also the engineers of the state highway department covering this section, are finding that 10-ft. lanes are not so free from accidents as 11 or 12-ft. lanes. This is especially true of the outer lane. Had we been designing the Davenport bridge, for example, we would have made the roadway width at least 24 ft. We would also, if possible, have introduced a mall separating the opposing traffic on this bridge, even though we could allow only a 2-ft. width for the purpose. In none of the cases quoted above was any attempt made to use such a mall. Of course, in the case of the non-stop express highway into St. Louis they would not be able to use the middle lane in alternating directions, if there were a mall; though two malls, one each side of the middle lane, would have permitted it. This, of course, is not recommended.

The traffic experts of the city of New York have informed us that, in cases where malls exist, there are fewer accidents than in cases where the traffic lanes are simply divided by white lines.

It would be informing to know whether traffic men and highway engineers throughout the country have made studies to show the advantages of a mall.

ALBERT E. THOMAS,
Principal Ass't. Engineer,
Topographical Bureau of Queens.

New York, N. Y.,
Jan. 6, 1936.

Oakland Bridge Cables

Sir—In your Oct. 31, 1935, issue, p. 622, the cables of the San Francisco-Oakland Bay Bridge are described as "20⅝-in. cables." In the issue of Dec. 26, 1935, p. 899, these cables are called "20-in.-diameter cables." The cables on this structure are nominally 28¾ in. in diameter after being squeezed.

JOHN A. BLUME,
Junior Steel Inspector,
S. F.-Oakland Bay Bridge.

San Francisco, Calif.,
Jan. 3, 1936.

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February 20, 1936

Special Flood Hazards

HEAVY SNOWFALLS and ice accumulations over the northern half of the country create favoring conditions for winter and spring floods in many valleys. As is well known, unexpected and severe local floods may follow the breakup of ice jams, a condition out of the range of the ordinary calculations based on maximum runoff and therefore presenting a special hazard not always considered in flood estimates or waterway determinations. A somewhat different hazard can easily develop in respect to major streams, and particularly the main channels of the Mississippi Valley, for a general thaw of such kind as to produce unusual concentration of runoff would produce abnormal stages, especially when combined with continuing rains. Present indications are that the year may add materially to existing flood knowledge. Whether floods materialize or not, the possibilities that lie in the present volume of snow deposit constitute a renewed warning as to potential flood dangers and the need for timely protective planning.

Leaders Ahead

COMMENTING ON THE SALARY STATISTICS compiled by the committee on salaries of the American Society of Civil Engineers, E. P. Goodrich stated at the recent annual meeting of the society that the statistics show men in supervisory positions to be better paid than those in positions requiring special technical skill. That conclusion will not come as a surprise to those who have observed salary trends in engineering as well as in other fields. There are few fields in which it is not true that ability to direct the efforts of others commands higher pay than skill with head or hands. The reason lies in the fact that men with the first qualification are the more difficult to find. And this appears to be especially true of engineers. In the hard task of acquiring an engineering education there are not many opportunities to develop skill in leadership, and few men see the advantage of seeking such opportunities. The findings of the salary committee should lay new emphasis on the desirability of such training for engineers.

The Taxpayer's Concern

IN THE FLOW OF BILLS into Congress the taxpayer rarely becomes conscious of their direct bearing on his personal welfare until too late. This is likely to be the case with a bill that proposes a further moratorium on reclamation repayments. Were it properly titled it would be called a bill to tax every man, woman and child in the nation for the personal profit of small groups of landowners and their private creditors. It has no vestige of justification in either need or equity; the low farm prices and the drought troubles that led to the original moratorium five years ago have passed, and something approaching prosperity reigns on the projects. A further blanket moratorium therefore would not be relief but would mean the exploitation of the taxpayer for the benefit of private creditors, whose junior liens would be given preference over the prior lien of the United States. Underlying the insidious demand for a continuing moratorium is the attempt to secure cancellation of the $150,000,000 owed to the people in return for the irrigated farms given to the project landowners. The bill should be promptly buried, and every taxpayer from coast to coast is justified in demanding of his Congressman that he join in killing it.

What's in a Name?

TERMINOLOGY in the field of municipal wastes is well defined and established, but practice is erratic and confusion of meaning is surprisingly common. It is easy to avoid confusion if the distinctions between the three major divisions of municipal waste are kept in mind. Not because there is anything new involved but because it is well occasionally to refresh the memory of those who are not continually working in the sanitary field, the three commonly accepted definitions are repeated here. *Garbage* is waste from the preparation and consumption of food; the term is exclusive. *Rubbish* is general waste not including food waste, and comprises both combustible and non-combustible materials. If rubbish is mixed with garbage the whole then becomes *refuse*, a generic term that includes household wastes in the aggregate. In discussion of incineration it is particularly necessary to keep these distinctions in mind, and to avoid such terms as "mixed garbage," or use of "refuse" when garbage-free rubbish is meant. The subject of refuse disposal is troublesome enough without being further obscured by confusion of terminology.

The Psychological Factor

AS ACCUMULATING DATA on highway accidents are assembled and studied, road safety becomes an ever more complex question. Factors not clearly recognized heretofore are brought to light by the analysis of the effect of traffic density on safety as discussed by Major Wm. G. Sloan before the Association of Highway Officials of the North Atlantic States last week. He found, quite as would be expected, that accident frequency is low when traffic is light and increases as traffic becomes more dense; but he then discovered the new fact that when traffic density increases beyond a certain point the accident rate again drops. In considering this observation one can hardly escape the conclusion that important psychological factors are involved in accident causation, and that the effects of traffic and road conditions on the mental processes of vehicle operators deserve closer study. Highway administrators are aware of the need of unremitting and close attention to the road on the part of the driver, yet they have concerned themselves but little with the distracting influence of confusing lights, noises and other matters that affect the driver's senses. The simple fact is that road safety involves the vehicle, the road and the coordination of these two as three independent elements, and before the best results are attained all three must be subjected to exhaustive study. The psychological elements that enter into proper coordination of vehicle and road are particularly worthy of scrutiny. If the road is made inherently safe by discovering and removing its accident-producing features, and if the best psychological condition is

created for proper adjustment of driving control to road and traffic, an important advance over present road safety records should result.

Equipment Makes the Job

CONSTRUCTION EXPERIENCE has revealed scores of instances where special equipment has made the job possible. This is true once more in the case of the canal sections of the Colorado River Aqueduct, where the development of two new machines made possible the integral placement of concrete pavement on the bottom and side slopes. These machines—a subgrader to trim the side slopes to exact grade and a full-span concrete paver and finisher to place the integral lining by the slip-form method—eliminate the undesirable longitudinal construction joint between the slope and bottom slabs. Uniform delivery of concrete and the vibration of the forms were but minor details worked out successfully after the big machines had been designed. Integral paving of the wide canal is another triumph for construction equipment.

Progress on the Mississippi

BOLDLY OUTFACING two generations of opposing opinion, river engineers have shortened by one-third the channel of the Mississippi River between the inflow of the Arkansas River and that of the Red. In this length of 300 miles over 100 miles of loops and bends have been eliminated by cutoff channels. The journey of river commerce has been shortened, and flood heights, the age-old terror of the lower Mississippi, have been lowered by the shortening.

When the work was begun three years ago these pages outlined the theory—substantiated by model tests—on which the undertaking was based. In the present issue, with the shortening substantially completed, the results are officially summarized and appraised. None will assume that the last word has now been said. The straightening deals with only one factor of the problem of increasing the efficiency of the river as a conduit. There remains the more intricate task of slope rectification and channel clearance, involving determinations of bed-load movement and silt burden that have only begun to be arrived at. A straightening of the overbank channel between levees is essentially a part of the needed rectification. Finally there is the matter of building relief channels for removing extreme flood peaks.

The fact that flood control on the lower Mississippi is still an unfinished job deserves immediate consideration. The valley has enjoyed security from flood visitation during nearly a decade, and this condition inevitably operated to dull the fear of floods; but the security was due to favoring nature and not to improved levees and a straightened channel. The floodways that are designed to protect Cairo and New Orleans have had no test, and the increased outlet of the straightened Atchafalaya is not yet approved by experience. The works have lessened the flood danger, and indeed have probably overcome the hazard of all but an extraordinary flood; but this latter is certain to come in time. Accordingly, now that the nation has put its hand to the task of Mississippi flood control, the possibility of its withdrawing from an unfinished work cannot be quietly contemplated. The greatest remaining obstacle is not engineering incapacity to provide protection nor lack of financial willingness to undertake reasonable expenditures—it is the competition of land interests for benefits. This motive is today blocking the Eudora and Atchafalaya floodways, necessary to complete the work.

In these disputes Congress now has the duty of bringing about a meeting of minds for national good and not for regional advantage. The issue of completion of the great project is direct and paramount, and Congress must not fail in providing for prompt completion.

Basic Doubts Cleared Away

THE SUPREME COURT'S decision on the Tennessee Valley power case is constructive. It clears away basic doubts as to the power of the federal government to carry out works of national development, and it encourages aggressive business methods in the power field.

Essential points decided by the Court are: *First*, that the government may develop power at dams built under the lawful exercise of its authority. *Second*, that it may lease or sell any and all surplus power over its own requirements, just as it may dispose of any other property. *Third*, that it may carry this power to a market. Only the third of these points is essentially new, the others having been amply established by earlier decisions; nevertheless, the clear definition of the government's authority makes the present decision a milestone in the history of governmental relations.

Had the challenge to the authority of the government been upheld, many operations long recognized as proper governmental activities would have been put in jeopardy as possibly illegal. The Reclamation Act could not easily be sustained, the decision on the Boulder Canyon Act might have to be reconsidered and reversed, and various flood-control operations would be under suspicion. A decision for the plaintiffs in the Tennessee Valley case might have made impossible such a stream development undertaking as the Central Valley project in California.

As to the second point: Whenever under authority of the Supreme Court's decision the government seeks a larger power market its action will inevitably stimulate the wider use of electricity, and this cannot fail to react favorably to the private power industry. Encouragement is given to the adoption of progressive and aggressive methods of developing markets. Such methods, as the year's record of power sales in the South demonstrates, will build a larger power market and will carry the advantages of readily available power farther afield.

Methods of marketing the power were not involved in the present case beyond the question of transmitting the power to a market. But the whole tenor of the decision suggests that publicly conducted power sale will be required to meet the demands of good business practice. An actual test of this point may yet have to come, but no one who reads the opinion of Chief Justice Hughes can entertain doubt as to the outcome of such a test. Assurance that any competition which government undertakings may offer to private industry will be on a fair compensatory basis is, of course, a powerfully constructive development for the entire electrical field.

Thus, both private business and public business have a clearer path as a result of the decision. The outlook for consistent progress in business enterprise and in the planning and execution of public development works is definitely improved.

CURRENT NEWS

Housing Plans Still Tentative

FHA credit plan may be liberalized to further stimulate residential building; government subsidies discussed.

Washington Correspondence

MUCH EXCITEMENT caused by Senator Wagner's broad remarks that President Roosevelt is determined upon a housing program that would run "less than $300,000,000 or $400,000,000" the first year soon subsided when the President said that a conference on Feb. 14 with Senator Wagner, Secretary Morgenthau and Peter Grimm with reference to housing had constituted only a preliminary discussion and that no specific plan had been agreed upon. Senator Wagner's remarks following the conference, however, indicated that the National Housing Act will be further liberalized by extending Title I covering the modernization credit plan which expires by statutory limitation on April 1; also that private residential construction may be stimulated by raising above 80 per cent the amount of the first mortgage insured under FHA's mutual mortgage insurance system under Title II of the act.

Senator Wagner also indicated that the government would continue its slum clearance program centered around a plan for substituting government-built slum clearance projects with aids to local housing authorities in the form of a grant-and-loan or a straight loan at a nominal interest rate constituting a subsidy. Such a program will look big, but actually will require very little outlay of cash this year as housing authorities have been set up in only a few states and cities.

"In fact," said Senator Wagner upon reflection, "we may wind up with very little money for slum clearance."

The President also is mulling over with his housing executives proposals for liberalizing provisions of the National Housing Act by permitting FHA for a limited period to insure mortgages covering 90 per cent of the appraised value of new houses costing under $5,000.

FHA's home modernization credit plan will probably be extended until next December but the administration's policy now is to taper off on that line in favor of encouraging private industry to build new homes for low-income families.

RFC to buy mortgages

FHA concluded an arrangement this week by which the RFC mortgage company agrees to purchase FHA-insured mortgages on a basis of 4½ per cent net, thus allowing the mortgagee not only ½ per cent paid by the borrower as an annual service charge but an additional ½ per cent out of the 5 per cent interest charge. RFC's fee for discounting will be ½ per cent payable when it contracts to purchase the mortgage. Under a previous arrangement, RFC netted the full 5 per cent interest rate, plus discount charge, allowing the mortgagee only the ½ per cent to which he is entitled for servicing. Commitments have totaled only $2,000,000.

In order to stimulate residential building, the new discount system will apply only to mortgages on new construction but is retroactive to April, 1935. Greater utilization of the RFC mortgage discounting facilities does not signify abandonment by FHA of its plans for establishment of national mortgage associations to purchase FHA-insured mortgages and issue debentures against them for sale on the investment market.

Interurban Plans Completed for San Francisco Bay Bridge

Plans and contract forms for interurban railway facilities and service on the San Francisco-Oakland Bay Bridge have been completed by the California Toll Bridge Authority and now await approval of the California Railroad Commission and the RFC. The RFC already has agreed to advance an additional $10,000,000 for these facilities and this with the $5,000,000 saved out of the original $61,400,000 RFC loan will provide the funds necessary to equip bridge and terminal for interurban service.

The proposed contracts are between the Bridge Authority and two railway lines, the Southern Pacific and the Key System, Ltd. The stipulation is made that all interurban passenger ferry service shall be discontinued when the electric trains begin operation over the bridge. The Key Route uses 600 volts and the Southern Pacific 1,200 volts. Both voltages will be used on the bridge; an overhead catenary for 1,200 volts and a third rail for 600-volt equipment.

The contracts require the Bridge Authority to expend $4,060,000 for alterations of existing railway equipment to make it suitable for bridge service. In return, properties and rolling stock to this value are to be transferred by the railway companies to the Bridge Authority. Title to the bridge railway and the San Francisco terminal will remain with the Bridge Authority. The terminal is designed to handle 500 passengers per minute.

House Labor Committee Asks Full Silicosis Investigation

A full investigation of silicosis as an industrial disease is provided for in a resolution reported by the House Labor Committee on Feb. 19. The resolution empowers a House labor subcommittee to subpoena witnesses and would appropriate $10,000 for the investigation. The subcommittee will be composed of the same five members that have been conducting preliminary hearings on the resolution, which was introduced by Rep. Marcantonio of New York. Next week the House Rules Committee will be asked for early consideration of the resolution on the floor.

Granite Block Chosen For Elevated Highway

Block wearing surface selected for rest of New York City's West Side highway following controversy over concrete.

IGNORING recommendations of engineers of the office of the Commissioner of Accounts and bitter protests by the Portland Cement Association, the New York Board of Estimate on Feb. 10 approved the use of granite block wearing surface on the two sections of the West Side elevated highway yet to be built. In approving the granite block the board upheld C. M. Pinckney, chief engineer of the Borough of Manhattan, under whose direction the highway is being built, and ended a long controversy over the type of wearing surface to be used. The remaining sections lie between 46th and 59th Streets and between the Battery and Canal St., and involve 100,000 sq.yd. of pavement. The sections of the elevated roadway now in use are all paved with granite block on concrete base.

The controversy centered over the yearly cost of the wearing surface, based on the probable length of life of granite block and concrete surfaces. In contending for granite block, Mr. Pinckney placed the length of life of this material at 50 years, as compared with a 10-year life for concrete pavement. This short life allotted to concrete was disputed by both Commissioner Blanshard and the Portland Cement Association, both holding that the minimum length of life of concrete paving should be considered as twenty years and the probable life as 30 to 35 years. Considering a ten-year life for concrete, it is admittedly more expensive than granite block; on a twenty-year basis the concrete is cheaper. The controversy concerned only the wearing surface, as all parties agreed that a structural concrete slab 7¾ in. thick was necessary regardless of type of paving.

Two types of concrete suggested

Commissioner Blanshard in a report to the Board of Estimate suggested consideration of two types of concrete wearing surface, one a monolithic slab 9¾ in. thick, heavily reinforced; the other a 4-in. top course placed on the structural slab, reinforced lightly. He reported that the taxpayers would save from $200,000 to $450,000 on the work yet to be done, the amount depending upon the type selected. In comparing the annual cost of granite block with that of the 4-in. top course, Mr. Blanshard estimated that of the block (50 years) at 22.6c. per sq.yd.; that of concrete (20 years) at 14.72c., or 57½ per cent of the cost of the block. He estimates the annual cost of the block and its structural slab, including waterproofing, at 52.88c. per sq.yd., while the cost of a 9¾-in. monolithic concrete slab is estimated at 44.15c., a saving of 16½ per cent. He quoted many authorities to substantiate his claim of a twenty-year life for concrete.

Mr. Pinckney compared the annual cost

of the complete granite block floor, including the structural slab, with that of the cost of a monolithic type of paving as used on the Pulaski Skyway in New Jersey, which is heavier than that recommended by Mr. Blanshard, and is reinforced with closely-spaced trusses. He also assigns a life of only ten years to the concrete. On this comparison he estimates the annual cost of the monolithic concrete as 84.04c. per sq.yd., as compared with 49.04c. for granite.

The Portland Cement Association in a report to the board quoted maintenance figures, favorable to concrete, and pointed out that the cost of turning the granite block at the end of 25 years, estimated at $2.36 per sq.yd., was not considered in the Pinckney estimates.

The Blanshard report also considered the use of brick, which was condemned by chief engineer Pinckney.

Mr. Pinckney concluded his report with the following statement:

"Granite block pavement will meet all the reasonable requirements of comfort, safety, dependability and durability without requiring constant attention, anxiety, interruption to traffic or burdensome cost to keep and preserve for at least 50 years.

"A concrete wearing surface cast integral with the floor slab, exposed to the weather, elastic deformation of the structure, and wear and tear of 38,000 vehicles a day, will inevitably crack and break, and in eight to ten years these cracks and breaks will assume serious proportions and result in irreparable damage. The smooth riding qualities of the original screeded surface disappear as the cracks develop and are repaired; the surface becomes uneven, unsightly and there may be considerable apprehension in riding on a shattered stress-bearing floor slab.

"A 4-in. concrete supplementary pavement is not recommended.

"Brick pavement is incapable of carrying the loads at the speeds prevailing on the West Side highway and should not be seriously considered."

Start on Delaware Water Supply Included in New York Budget

Start of work on the Delaware River water supply system for New York City is provided for in the capital stock budget now being considered by the city's board of estimate and apportionment. Final decision on the matter may not be reached for several weeks.

The Delaware project was approved by the board of estimate on Jan. 12, 1928. New Jersey brought suit in 1929 to stop the diversion and on May 4, 1931, the U. S. Supreme Court gave the city the right to divert 440,000,000 gal. per day from the upper Delaware. (For details of the proposed system see *ENR*, Aug. 11, 1927, p. 218, May 7, 1931, p. 777, and May 31, 1934, p. 698.)

The work now proposed would be simply sinking and lining of the many shafts required for the 85 miles of aqueduct tunnel and the turning of the tunnel headings in readiness for tunnel construction. This work can be done in about one year. The completion of the tunnel and appurtenant structures and the Rondout and Neversink reservoirs will require six or seven years more.

Supreme Court Holds TVA May Transmit Navigation Dam Power

Contract Attacked by Preferred Stockholders of Alabama Power Company Upheld by 8-to-1 Vote Affirming Government's Authority to Sell and Transmit Surplus Power Without Limitation on Surplus.

IN A comprehensive decision on the TVA case rendered Feb. 17, the United States Supreme Court by an 8-to-1 majority upheld the Tennessee Valley Authority by affirming the right of the government to sell and to transmit to a market the power created by a dam lawfully built. Wilson Dam was held to be lawfully built under the government's war powers and commerce powers. The majority decision was rendered by Chief Justice Hughes; a minority finding was made by Justice McReynolds.

The case (Ashwander v. Tennessee Valley Authority) was brought by preferred stockholders of the Alabama Power Co. to prevent performance of a contract entered into by the company with the Tennessee Valley Authority on Jan. 4, 1934, under which the Authority was to purchase from the company certain transmission lines, substations, lands, etc., and was to enter into certain power purchases and interchange. The transmission lines in question extend from Wilson Dam, built across the Tennessee River at Muscle Shoals, a short distance above Florence, Ala., into seven counties of Alabama within a radius of about 50 miles. They serve a population of about 190,000 including about 10,000 individual customers.

The court divided on the question of whether these preferred stockholders had a right to sue, a majority of five acknowledging that right, as the company (all the common stock of which was owned by the Commonwealth & Southern Corp.) declined to accede to the demands of these stockholders to annul the contract.

Suit was brought originally in the federal district court, which decided in favor of the plaintiffs (*ENR*, Feb. 28, 1935, p. 331). Later the circuit court of appeals reversed the district court (*ENR*, July 25, 1935, p. 132), and the case went to the Supreme Court on appeal of the plaintiffs.

Four major points decided

Chief Justice Hughes' opinion, after affirming the right of the plaintiffs to bring the suit and limiting the scope of the issue, covered four major points: (1) Wilson Dam is a lawfully built government structure, as it was built for the purpose of national defense and the improvement of navigation; (2) the government may develop the potential power created at the dam and may sell or lease the surplus power over and above its own requirements; (3) the amount of the surplus of which it may thus dispose is not limited; (4) the government may transmit this power to a market. However, the opinion disclaimed any pronouncement on the government's right to acquire or operate local distribution systems, on the status of other dams or power developments in the Tennessee Valley, or on the validity of the Tennessee Valley Act apart from its relation to the specific contract which had been brought up for question.

Wilson Dam legal

On the constitutional authority for the construction of the Wilson Dam the decision says:

> Authority for its construction is found in Section 124 of the national defense act of June 3, 1916. . . . The President was authorized to lease or acquire by condemnation or otherwise such lands as might be necessary, and there was further provision that "the products of such plants shall be used by the President for military and naval purposes to the extent that he may deem necessary, and any surplus which he shall determine is not required shall be sold and disposed of by him under such regulations as he may prescribe."
>
> The act of 1916 also had in view "improvements to navigation." Commerce includes navigation. . . . The Tennessee River is a navigable stream, although there are obstructions at various points because of shoals, reefs and rapids. The improvement of navigation on this river has been a matter of national concern for more than a century. . . . The Wilson Dam project, adopted in 1918, gave a nine-foot slack water development for fifteen miles above Florence. . . . While in its present condition the Tennessee River is not adequately improved for commercial navigation, and traffic is small, we are not at liberty to conclude either that the river is not susceptible of development as an important waterway, or that Congress has not undertaken that development, or that the construction of the Wilson Dam was not an appropriate means to accomplish a legitimate end.

The court concludes that Wilson Dam and its power plant were built in the exercise of constitutional functions.

Government may sell power

Taking up the question of the government's authority to dispose of power from the dam, the court declares that Section 3 of Article IV of the Constitution gives the government authority to dispose of its property. It affirms on the strength of many prior decisions that the power of falling water is such government property, as is also the electric energy that may be produced from it, and that such power may be leased or sold. No limits are set to the method of such disposal.

> The power of falling water was an inevitable incident of the construction of the dam. That water power came into the exclusive control of the federal government. The mechanical energy was convertible into electric energy, and the water power, the right to convert it into electric energy, and the electric energy thus produced, constitute property belonging to the United States.

Referring to legislation, practices and

court decisions on the government's right to lease or sell minerals from its mineral lands, the court indicated that the same freedom of action pertains to the disposal of water power.

> That the water power and the electric energy generated at the dam are susceptible of disposition as property belonging to the United States is well established.

Surplus Not Limited

In the lower court decision the question of the meaning of "surplus" was an issue, and the district court held that the term surplus power should be limited. The Supreme Court rejects this view. It says:

> The government has no less right to the energy thus available by letting the water course over its turbines than it has to use the appropriate processes to reduce to possession other property within its control, as, for example, oil which it may recover from a pool beneath its lands, and which is reduced to possession by boring oil wells and otherwise might escape its grasp. And it would hardly be contended that, when the government reserves coal on its lands, it can mine the coal and dispose of it only for the purpose of heating public buildings or for other governmental operations. Or, if the government owns a silver mine, that it can obtain the silver only for the purpose of storage or coinage. Or that when the government extracts the oil it has reserved, it has no constitutional power to sell it. Our decisions recognize no such restrictions. The United States owns the coal, or the silver, or the lead or the oil it obtains from its lands, and it lies in the discretion of the Congress, acting in the public interest, to determine of how much of the property it shall dispose.
>
> In the case of the United States vs. Chandler-Dunbar Co., supra, the statutory provision to which the court referred was "that any excess of water in the St. Mary's River at Sault Sainte Marie over and above the amount now or hereafter required for the uses of navigation shall be leased for power purposes by the Secretary of War upon such terms and conditions as shall be best calculated in his judgment to insure the development thereof." It was to the leasing, under this provision, "of any excess of power over the needs of the government" that the court saw no valid objection.

May Transmit Power

The court further held that the authority to generate and sell power extends also to carrying that power to a market. It was pointed out that:

> The constitutional provision is silent as to the method of disposing of property belonging to the United States. That method, of course, must be an appropriate means of disposition. . . . The contemplated interchange of energy is a form of disposition and presents no questions which are essentially different from those that are pertinent to sales.
>
> The transmission lines which the authority undertakes to purchase from the power company lead from the Wilson Dam to a large area within about fifty miles of the dam. These lines provide the means of distributing the electric energy, generated at the dam, to a large population. They furnish a method of reaching a market. The alternative method is to sell the surplus energy at the dam, and the market there appears to be limited to one purchaser, the Alabama Power Co. and its affiliated interests.
>
> We know of no constitutional ground upon which the federal government can be denied the right to seek a wider market. We suppose that in the early days of mining in the West, if the government had undertaken to operate a silver mine on its domain, it could have acquired the mules or horses and equipment to carry its silver to market. And the transmission lines for electric energy are but a facility for conveying to market that particular sort of property, and the acquisition of these lines raises no different constitutional question, unless in some way there is an invasion of the rights reserved to the state or to the people. We find no basis for concluding that the limited undertaking with the Alabama Power Co. amounts to such an invasion. Certainly, the Alabama Power Co. has no constitutional right to insist that it shall be the sole purchaser of the energy generated at the Wilson Dam; that the energy shall be sold to it or go to waste.

Scope of Decision Limited

In affirming the right to transmit power from Wilson Dam the court carefully limited the scope of its decision to the question presented, and refrained from entering into questions of establishing industries, the construction of other dams, the acquisition or operation of urban distribution systems or the validity of the Tennessee Valley Act or of any claims made by the TVA.

Dissenting views

There were two dissenting opinions. Justice Brandeis, joined by Justice Stone, Roberts and Cardozo, concurred in the finding of constitutionality but held that the case should not have been entertained. Among the reasons he advanced is the assertion that under established rules of court practice a decision must be limited to the specific issue presented, in this case the contract of Jan. 4, 1934, and that when this issue may be determined on other grounds than that of constitutionality, as in the present case, the court is not justified in taking up the constitutional question.

Justice McReynolds in a sharply dissenting opinion held that all the acts and statements of the Tennessee Valley Authority should be considered in interpreting the issues of the case. He held that these show the Wilson Dam power contract to be part of a primary purpose "to put the federal government into the business of distributing and selling electric power throughout certain large districts, to expel the power companies which had long serviced them, and to control the market therein." He said of the Authority that "with $50,000,000 at their command they started out to gain control of the electrical business in large areas and to dictate sale prices. The power at Wilson Dam was the instrumentality seized upon for carrying the plan into effect." In his conclusion he said:

> If, under the thin mask of disposing of property, the United States can enter the business of generating, transmitting and selling power as, when and wherever some board may specify, with the definite design to accomplish ends wholly beyond the sphere marked out for them by the Constitution, an easy way has been found for breaking down the limitations heretofore supposed to guarantee protection against aggression.

North Atlantic States Highway Meeting

Speakers at Atlantic City meeting express concern over immediate future of state highway programs

REAL CONCERN over the immediate future of the highway building programs of the several states was expressed at the twelfth annual meeting of the Association of Highway Officials of the North Atlantic States held at Atlantic City, Feb. 12-14. Speakers pointed out that the end of emergency federal aid for highways is at hand, and unless diversion of gasoline taxes and license fees to purposes other than roadbuilding is stopped, new highway construction will be impossible, and even the normal maintenance and reconstruction operations will necessarily be curtailed.

Diversion of highway funds was also declared to be a blow at safety, for much necessary reconstruction and the building of new roads and structures required to provide safe transportation facilities will be hampered unless adequate funds are available. The aesthetic development of our highway system was given considerable attention. Several excellent technical papers were presented on paints, cement and concrete, tar and asphalt, and concrete paving joints.

The sentiment of the convention against diversion of highway funds was sounded right at the start by Donald Sterner, Commissioner of Highways, New Jersey, in an address of welcome in behalf of Governor Hoffman, unable to be present. Mr. Sterner deplored the trend toward diversion in no uncertain terms, and particularly called attention to the situation in his state where determined efforts are being made in the legislature to "freeze" $8,000,000 of highway funds for relief purposes, which would stop all letting of new contracts this year. The speaker pointed out that this fund spent on the highways would provide a year's employment for the heads of 8,000 families, while it would only take care of the relief needs of the state for three weeks.

WPA plan criticized

F. R. Everett, president of the association, in the opening address not only condemned highway money diversion, but severely criticized the WPA plan of highway building, especially where it is being done without state or federal supervision. He declared that the building of WPA farm-to-market roads by those inexperienced in highway planning and construction is entirely wrong, wasteful and unsound. Mr. Everett made an interesting comment on contract snow removal, which has been tried out in his state (New Hampshire), branding it as unsuccessful because of the contractors' reluctance to plow right down to the pavement, a procedure hard on equipment but regarded as necessary if formation of ice on the surface is to be prevented.

Three speakers, E. C. Lawton of New York, H. W. Griffin of New Jersey, and E. C. Weldon of Connecticut, presented widely divergent views on the subject of transverse joints in concrete pavements. Every type of joint was discussed, praised and condemned, and the concensus of the discussion revealed the necessity for further

study of this important subject. The speakers agreed, however, that stable subgrades would eliminate much of the present joint trouble.

Recent developments in asphalt and tar road construction were presented by Bernard E. Gray, of the Asphalt Institute and A. R. Taylor, of Koppers Products Co., respectively.

The control of concrete manufacture for durability was discussed by P. J. Freeman of the Tennessee Valley Authority and H. S. Mattimore of the Pennsylvania highway department. Mr. Freeman stressed the selection of proper aggregates as important in securing of a durable concrete; Mr. Mattimore entered into a technical discussion of cements.

Attendance at the meeting was the best in the history of the organization. Nearly 900 delegates and visitors were registered, and attendance at all sessions was heavy.

New officers installed for the coming year are: President, James S. Bixby, district engineer, New York State department of public works, Poughkeepsie; vice-president, W. G. Sloan, state highway engineer, New Jersey; secretary-treasurer, A. Lee Grover, secretary, New Jersey highway department (re-elected).

Extensive abstracts of several interesting papers, not mentioned in the above account, will be presented in an early issue of *Engineering News-Record*.

SOCIETY CALENDAR

AMERICAN CONCRETE INSTITUTE, annual meeting, Chicago, Ill., February 25-27

AMERICAN RAILWAY ENGINEERING ASSOCIATION, annual meeting, Chicago, Ill., March 10-12.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

CONFERENCE ON HIGHWAY ENGINEERING, annual meeting, University of Illinois, Urbana, February 27-28.

AMERICAN SOCIETY FOR TESTING MATERIALS, regional meeting, Pittsburgh, Pa., March 4, and meetings of Committees, March 2-6.

NEW YORK SAFETY CONFERENCE, 7th annual meeting, New York City, March 3-5, 1936

NEW JERSEY MOSQUITO EXTERMINATION ASSOCIATION, annual meeting, Atlantic City, N. J., March 4-6.

KENTUCKY-TENNESSEE SECTION, AMERICAN WATER WORKS ASSOCIATION, Lexington, Ky., March 23-25.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION, Oswego, N. Y., March 26-27.

FLORIDA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual meeting, Tampa, March 31-April 1.

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Lafayette, Ind., April 7-9.

AMERICAN WOOD PRESERVERS ASSOCIATION at its annual meeting elected the following officers: R. S. MANLEY, president; H. R. DUNCAN and B. M. WINEGAR, vice-presidents, and H. L. DAWSON, secretary-treasurer.

Mosquito Extermination Association Meeting

Intensive discussion of the problems of mosquito control and extermination has been planned for the annual meeting of the New Jersey Mosquito Extermination Association to be held in Atlantic City, N. J., March 4-6. Among the important papers to be presented will be one on mosquito control facts by Dr. Thomas J. Headlee, entomologist, New Jersey Agricultural Experiment Station. The need for additional information concerning the biology of mosmosquitos will be discussed by Dr. L. L. Williams, U. S. Public Health Service; J. L. Clarke and D. M. Rees will discuss mosquito control and extermination in Des Plaines Valley and Salt Lake City, respectively. Economic results of mosquito control work in Canada will be discussed by Arthur Gibson, Dominion entomologist. A résumé of mosquito control activity throughout the world will be discussed by Dr. F. C. Bishopp, principal entomologist, U. S. Department of Agriculture.

Boulder Dam Acceptance Date Set

Formal acceptance of Boulder Dam and power house, terminating the contract and marking the end of actual construction work on the project, has been set by the Department of Interior for March 1, less than five years after work was started. More than a year ago, Feb. 1, 1935, Boulder Dam diversion tunnels were closed and water storage begun.

The Bureau of Reclamation will take over the plant and equipment of the contractor, for use without charge until Oct. 1, for the installation of power house equipment. Four of the 82,500-kv. ampere generators are being installed at this time. Ultimately the power house will contain fifteen generators of this size and two of 40,000-kv. ampere capacity.

Under its contract Six Companies, Inc., will receive approximately $54,700,000. The work now being completed originally was expected to require 2,565 days and the contractor was given until April 28, 1938, to finish the job. Originally estimates indicated that the work would cost $48,866,254. Six Companies, Inc., estimated the cost at $48,890,995.50. With deductions made by the Bureau of Reclamation for various services, the actual cash payment will be about $51,950,000.

A change in the design of the power house increased the cost by more than $2,000,000, and when the penstock tunnels were enlarged the cost was increased by over $1,000,000. The amount of concrete actually poured in Boulder Dam itself was 3,240,871 cubic yards.

Virginia Bridge & Iron Co. Acquired by U. S. Steel

The Virginia Bridge & Iron Co., one of the largest steel fabricators in the South, has been acquired by the Tennessee Coal, Iron & Steel Co., a subsidiary of the U. S. Steel Corp. The Virginia Bridge & Iron Co. was incorporated for $3,000,000 and had an annual capacity of 125,000 tons from its plants at Roanoke, Va., Birmingham, Ala., and Memphis, Tenn. C. Edwin Michael, president of the Virginia Bridge & Iron Co., will continue to be connected with the company, but will be succeeded as president by L. A. Paddock, who has been president of the American Bridge Co. Other executive personnel will be continued under the new arrangement.

Part of Bankruptcy Act Declared Void

A subsection of the bankruptcy act, listing three specific methods and offering a fourth and more general rule, of satisfying creditors who do not wish to accept reorganization plans, was declared unconstitutional by the Federal Court of Appeals in Cincinnati, Feb. 13.

The decision affects Subsection B-5 of Section 77-B of the bankruptcy act. This subsection provides that creditors unwilling to accede to reorganization plans may be satisfied by any one of three specified ways or by such means as the judge may think equitable and fair under the circumstances. The subsection also requires that two-thirds of the creditors consent to the reorganization plan. The court upheld a prior decision which held that lien holders have substantive property rights to protect their interests by bidding at the sale and controlling the property during the period of default. The decision said that any invasion of these rights "under the authority of the present statute is . . . clearly violative of the due-process clause of the Fifth Amendment . . ." The decision upheld a rejection of an application of reorganization by the Tennessee Publishing Co.

Coordinated Selling Planned by Materials Dealers

A plan to coordinate the various agencies, such as materials dealers, contractors and the manufacturers, in a comprehensive effort to increase the desire for new and remodeled homes, has been put into operation by the Johns-Manville Co., New York. The new program, which was announced at a meeting of 400 dealers from thirteen states on Feb. 1, is to operate through the Johns-Manville Housing Guild System which will set up local guilds throughout the country. In connection with this plan, a two-weeks school for retail dealer sales managers was opened on Feb. 17 and devoted to intensive study of the application of the plan.

The guild system comes as a result of foreseeing the need for an inclusive merchandising plan by Johns-Manville Co., which made, in 1926, the first step by expanding its potential of materials in a house. It was then 2 per cent and today the total Johns-Manville material that can go into a house reaches 28 per cent. In order to bring about the desired result it was seen that it was necessary to coordinate three points of view; that of the manufacturer, the building material dealer and the contractor.

Texas Engineers Organize New Professional Society

The Texas Society of Professional Engineers has been organized at San Antonio, Tex., with 100 charter members. Local chapters are to be set up in Austin, Dallas and at San Antonio. The new society is to be affiliated with the National Society of Professional Engineers making the eleventh state society to join the national organization and bringing the membership in affiliated societies up to 4,600.

Permission Asked for Niagara River Dam

Because of the damage done by the extensive ice jams in the Niagara River, the Canadian Niagara Power Co. has applied to the Canadian Park Commission for permission to build a $250,000 concrete dam in the Niagara River. The dam will be 900 ft. long and will extend into the Niagara River from the Canadian shore. Its purpose will be to prevent ice from coming in to the forebay and plugging up the intakes. If the commission approves the application, work will be started early in the spring so as to be completed by next September.

The shifting masses of ice in the lower Niagara River have already caused extensive damage to shore front property. On the Lewiston, N. Y., side of the river, the ice wrecked a number of cottages and did extensive damage to the Canada Steamship Line dock, where the water rose 7 ft. and flooded a number of large buildings including the waiting rooms and offices of the steamship company. Across the river at Queenston, Ont., another dock of the Canada Steamship Lines is reported to have been shifted from its foundations by pressure of the ice.

Personals

J. K. BLACK, of the engineering section of the Tennessee Valley Authority has been promoted to assistant construction engineer at Chickamauga Dam.

H. LESTER NEWHALL, Akron, Ohio, assistant WPA field engineer, has resigned to accept a position with the Federal Housing Administration. Mr. Newhall had been chief engineer at the Akron waterworks for fifteen years before taking up his duties as assistant WPA field engineer.

ROLF E. LJUNGKULL, chief engineer, American Hoist & Derrick Co., has been appointed to the board of directors to fill the position left by HOWARD S. JOHNSON, who had been vice-president for a number of years.

BLAKE R. VAN LEER, dean of the College of Engineering, University of Florida, has been appointed as a member of the state board of engineering examiners to succeed MELVILLE PRICE, who has resigned.

HARRY A. THOMPSON has severed his connection with Mackie-Thompson-Tamm, Inc., Chicago, Ill., to begin a private engineering and contracting business in the same city.

GLENN D. HOLMES, formerly chief engineer for the Syracuse Intercepting Sewer Board, has accepted appointment as director and chief engineer of the Onondaga County Sanitary Sewer and Public Works Commission for construction of a sewer system and treatment works.

M. L. NICHOLS, head of the agricultural engineering department of the Alabama Polytechnic Institute, has accepted a position as chief agricultural engineer of the Soil Conservation Service in the Southeastern states.

ARTHUR CUTTS WILLARD, president of the University of Illinois, received the F. Paul Anderson Gold Medal awarded by the American Society of Heating and Ventilating Engineers for distinguished scientific achievements in the field of heating, ventilating and air conditioning at the 42nd annual meeting of the society held in Chicago, Jan. 29. Dr. Willard was commended for his outstanding service as a consultant on the ventilation of the Holland Tunnel.

JOHN F. LABOON has accepted a position as director of the department of highways, bridges and tunnels of Allegheny County, Pa., and has withdrawn from the firm of Chester, Laboon, Campbell, Davis & Bankson, Pittsburgh, Pa., which will in the future be known as the Chester Engineers.

MARK B. OWEN, formerly superintendent, Department of Public Works, Dearborn, Mich., has become associated with the Nichols Engineering and Research Corp., New York City. During Mr. Owen's régime at Dearborn he was largely instrumental in reestablishing chemical treatment of sewage. He is president of the International Association of Public Works Officials which with the American Society of Municipal Engineers maintains a joint secretariat at Chicago.

LEE G. WARREN, formerly construction manager for the Frederick Snare Corp. at Tygart dam, has been appointed construction engineer in charge of the Chickamauga dam, to be built by the Tennessee Valley Authority at an estimated cost of $32,000,000 on the Tennessee River near Chattanooga. Associated with the Dixie Const. Co. and the Phoenix Utility Co. in the past, Mr. Warren has built many of the large dams in the South and Southwest.

RALPH O. BAIRD has been appointed by Gov. Johnson of Colorado to see that the roads program which it is planned to carry out with a loan of $25,000,000 from the federal government is done with the greatest possible efficiency.

ALFRED E. ROCHE, for the past eight years director of public works at Troy, N. Y., has been succeeded in that position by WM. F. LUBY, former engineer in the Bureau of Water. Mr. Roche has served in the Department of Public Works for sixteen years and has been engineer on many of notable enterprises in the Albany and Troy districts.

ADRIEN PLAMONDON, consulting engineer of Montreal, has been appointed a member of the Electrical Commission of the city of Montreal, in place of DR. AUGUSTIN FRIGON, who resigned on his appointment as Chairman of the Quebec Electricity Commission. The other members of the commission are DE GASPE BEAUBIEN and M. KELTCH.

L. P. COOKINGHAM, city manager of Plymouth, Mich., has been named city manager of Saginaw, Mich., under a new charter effective Jan. 6. For several years he was in the city engineering department of Flint and for four years was city manager at Clawson. He has been at Plymouth for five years.

MAJ. ROBERT R. NEYLAND, Corps of Engineers and former Army football player and coach, has been relieved of his present assignment in the Panama Canal Department and will return to the United States and await retirement. It is unofficially understood that he will accept a position as head coach for a southern university after his retirement.

Sanitary Bacteriology Courses Offered

A six-weeks course in general and sanitary bacteriology will be offered from June 16 to July 28 by the Department of Biology and Public Health, Massachusetts Institute of Technology. The course is designed to appeal to public health laboratory technicians, sanitary inspectors, waterworks operators, milk inspectors and milk analysts. The course will consist of lectures, demonstrations, laboratory work and field trips. The laboratory work will include, among other things, the bacteriological examination of water and milk. Students having adequate training and special interests may arrange to work on special problems most suited to their needs.

Bids to be Asked for Connecticut River Bridge

Bids for the construction of a bridge across the Connecticut River, connecting Middletown and Portland, Conn., and costing about $3,500,000, will probably be asked in the near future. Bond sales for financing the bridge now amount to $2,200,000. When the expenditures were authorized by the general assembly, a ruling was made by the attorney general for the state that the entire cost of the bridge had to be available before bids were asked. This ruling was subsequently changed at meeting, Jan. 28, after the attorney general, representatives of the Middlesex County Bridge Commission and state highway department had conferred on the project. The $1,300,000 balance of the bond issue will not be needed for at least one year, it was pointed out, and this change of ruling will save the Middlesex County Bridge Commission about $200,000 in interest charges. The cost of the project is being financed in part by a Middlesex County bond issue.

Contract for Grain Elevator Stirs Protests in Montreal

A contract has been awarded, by unstated private interests, to Carter Halls Aldinger, Ltd., contractors, of Winnipeg, Man., for the construction of a new 2,000,000 bushel grain elevator at the port of Three Rivers, on the St. Lawrence River between Montreal and Quebec. The exact amount of the contract is not known, but it is understood to be about $7,000,000. The site of the proposed elevator is adjacent to a newly constructed pier of the dominion government, the site having been leased by the federal authority.

The project has aroused strong protests in Montreal, and representations have been made to Hon. C. D. Howe, minister in charge of the Department of Marine, under which port work is supervised, by the Montreal Corn Exchange and other bodies. Montreal's grain exports have been seriously affected by the recently constructed elevator at Sorel, a small port opposite to Three Rivers, and similar consequences are again feared. Both Sorel and Three Rivers are practically free of ordinary port dues, being operated under the Department of Marine, and it is this fact which militates against the main ports of Quebec and Montreal.

Obituary

JAMES F. GALLIVAN, president of the Gallivan Construction Co., Greenville, S. C., died at his home there on Feb. 8. Mr. Gallivan had been engaged in industrial plant construction for the past 35 years.

JOHN DE B. WALBACH GARDINER, engineer and president of a contracting and engineering firm that bears his name, died at his home in New York City on February 12, at the age of 56. Mr. Gardiner was graduated from the U. S. Military Academy in 1905 and after working as an assistant engineer in Cuba, he returned to New York and became engineer for the Minwax Co., where he specialized in the design and installation of waterproofing for various structures. He later organized the firm of which he became president.

H. W. BRENNAN, 66, civil engineer of Memphis, Tenn., died at his home there, Feb. 12. Mr. Brennan began his engineering work in railway surveys on the Tennessee Central and the Nashville, Chattanooga, and St. Louis railroads. He was a member of the first Tennessee highway commission and participated in preparing a report on state highway construction.

VERGIL JENKINS, a civil engineer of Ironton, Ohio, died there Feb. 1, after a long illness.

BENJAMAN M. CROMBIE, for 23 years superintendent of streets at Manchester, N. H., died at his home in that city on Feb. 10, at the age of 79.

CONSTRUCTION STATISTICS FOR THE WEEK

HIGHER private awards and an increased volume of highway construction awards raise this week's total engineering construction to $48,058,000. Of this amount $13,667,000 is for private work, $34,391,000 for public. Of the public, $857,000 is federal and $33,534,000 state and municipal. Corresponding values last year are: total, $10,896,000; private, $2,309,000; public, $8,587,000; federal, $1,530,000 and state and municipal, $7,057,000.

Streets and roads account for a large increase this week over the previous four with a total for the week of $10,623,000. Gains are recorded in all other classifications except public buildings which drops slightly below the high rate which has prevailed since Dec. 15. The classified totals are: waterworks, $3,997,000; sewerage, $3,493,000; bridges, $4,778,000; earthwork and waterways, $605,000; public buildings, $9,462,000; commercial buildings, $4,040,000; industrial buildings, $5,036,000.

The larger awards for the week include: factory for Ludlow Sales Corp., Edge Moor, Del., $1,500,000; steam power plant on Provo River, force account and separate contracts, Utah Power and Light Co., Provo, Utah, $1,600,000; nine-story addition for Montgomery Ward Co., Portland, Ore.; $750,000; exhibition building for Ford Motor Co., Dallas, Tex., $1,000,000; three schools, University City, Mo., $690,000; 7 armory buildings, New Jersey, $539,000; two high schools, Houston, Tex., $1,165,000; state office building, Olympia, Wash., $675,000; highways by Illinois, $808,000; by Mississippi, $702,000; by New York, $527,000; by Oregon, $598,000; by Texas, $582,000; by Wisconsin, $556,000; by Wyoming, $700,000; bridges by Texas, $334,000; by Wisconsin, $395,000; eliminating grade crossings at heavy-traffic streets, Louisville, Ky., $1,191,000; superstructure, bridge over Kansas River, State Highway Commission, Topeka, Kan., $660,000; paving and completing anchorages of East River Crossing, Contract 50, Triborough Bridge Authority, New York, $750,000; waterworks system, Longview, Tex., $417,000; filter equipment for purification plant, Milwaukee, Wis., $540,000; 10.5 mi. Crystal Springs pipe line and other pipe lines, Public Utilities Commission, San Francisco, Calif., $1,636,000; Section 2, Interceptor Sewer, Detroit, Mich., $635,000; sewerage disposal plant and sewerage system, Contract 3, Niagara Falls, N. Y., $2,000,000; land development at State Hospital, WPA labor, Mattapan, Mass., $678,000; 100 mi. natural gas mains at Kansas for Northern Natural Gas Co., Omaha, Neb., $1,000,000; rails, track fastenings, splice bars, work by day labor and separate contracts, N. Y. C. R.R., New York, N. Y. Est. $3,100,000.

New capital includes state and municipal bond sales $8,123,000, PWA allotment to Birmingham, $3,325,000 and change from loan and grant to Port Authority of New York for Midtown Tunnel to grant only due to sale of Port Authority bonds previously reported.

CONTRACTS

(Thousands of Dollars)

	Weekly Average Feb. 1935	Prev. 4 Weeks	Week Feb. 20 1936
Federal Government	$2,241	$3,777	$857
State and municipal	9,660	27,385	33,534
Total public	$11,901	$31,162	$34,391
Total private	5,121	12,849	13,667
Week's total	$17,022	$44,011	$48,058

Cumulative to date:
1935...$193,591,000 1936...$418,086,000

NEW PRODUCTIVE CAPITAL

(Thousands of Dollars)

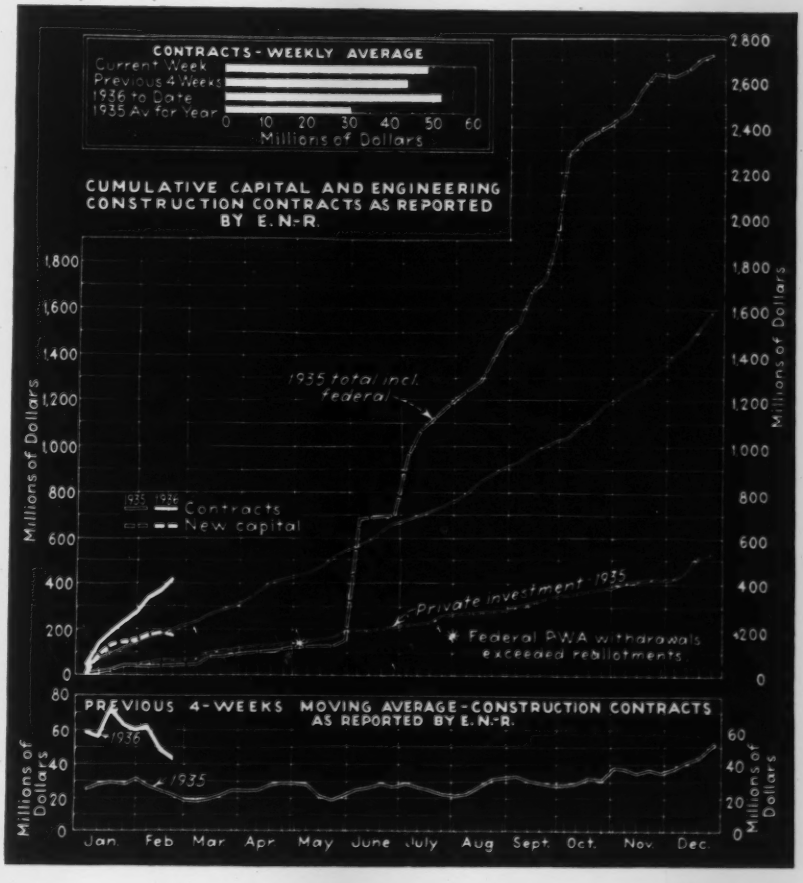
1936	Week Feb. 20	Cumulative
State and municipal	$8,123	$72,905
PWA non-federal	—29,395	36,858
RFC loans	.....	25,000
Corporate issues	25	29,266
PWA loans	.....	1,110
Total Non-Federal	—$21,247	$165,139
Federal	.....	3,920
Total new capital	—$21,247	$169,059

Cumulative to date:
1935...$38,472,000 1936...$169,059,000

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Feb., 1936	201.20	86.71	Jan., 1936	248	109
Jan. 1936	199.48	95.89	Dec. 1935	254	111
Feb. 1935	196.02	94.22	Jan. 1935	130	57
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47


CONTRACTS - WEEKLY AVERAGE
Current Week
Previous 4 Weeks
1936 to Date
1935 Av for Year
0 10 20 30 40 50 60
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E.N.R.
Millions of Dollars
1935 total incl. federal
Contracts
New capital
Private investment 1935
* Federal P.W.A. withdrawals exceeded reallotments
PREVIOUS 4-WEEKS MOVING AVERAGE - CONSTRUCTION CONTRACTS AS REPORTED BY E.N.R.
1936
1935
Jan. Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.

Construction Equipment and Materials

Rubber Pipe Joint For Waste Disposal

The Flexblock joint, a product of The B. F. Goodrich Co., Akron, Ohio, is now available for use with specially constructed ceramic pipe in low pressure and low temperature service. It offers a permanent and positive seal for bell-and-spigot pipe carrying sewage and industrial wastes. Its adaptation to ceramic pipe was developed in cooperation with the Robinson Clay Products Co. and U. S. Stoneware Co.

The Flexlock joint is a rubber ring or gasket having internal and external circumferential ribs which grip the bell and spigot of the pipe. While the gasket permits easy insertion of the spigot, the shape of the corrugations combined with the resilience of the rubber, forms a multiple seal which resists any tendency of the pipe sections to pull apart.

Installation is simple and can be handled by ordinary workmen. The gasket is first placed in the bell socket. The exposed surface of the rubber and the outside contact surface of the spigot are lubricated with a special liquid lubricant. In pipe sizes which can be manually handled, the joint may be made without any equipment. On larger sizes, a screw jack or yoke-type pulling device is required to pull the pipe together.

Highway Barriers Stop Motor Vehicles Safely

A barrier gate of the yielding type shown in the accompanying picture has been installed on the recently completed Park St. Bridge in Oakland, Calif. It is designed to keep motorists from driving through the usual warnings and gates. The device consists of a net made of steel cables and timber lowered into position across the roadway and attached to friction band brakes equipped with drums for pay-out cables. The latter cables, in turn, are attached firmly to an anchorage in the bridge structure below.

The brake bands cumulatively resist the progress of a vehicle striking the net barrier and thus cushion the shock of impact and lessen jar and damage to the car. The assembly is designed to stop a 10-ton truck traveling at 20 m.p.h. in less than 20 ft. The installation shown has a cable net 44 ft. in length which is raised, when not in service, to give ample head room over the roadway. The barriers are installed, by the R. M. Bunten Co., Seattle, Wash., licensed manufacturers, under the Sawyer barrier patents.

Polarized Light as Aid In Testing Structures

The development of Polaroid, a commercially produced cellulosic film containing dichroic crystals, which rearrange light waves, is expected by its producers, the Land-Wheelwright Laboratories, Inc., Boston, Mass., to be an important aid in determining the stresses developed in various structures. By setting up models of buildings and bridges, made of translucent materials such as celluloid or bakelite, and subjecting them to loads comparable to those actually encountered in the field the direction and location of the stresses are revealed by colored lines when viewed through the light polarizer.

Also, in reducing automobile headlight glare, thus helping to reduce driving accidents, Polaroid is expected to be of importance. By equipping both lamps and windshields with this material light rays are filtered and rearranged so as to eliminate a large amount of glare, thus leaving usually obscure objects perfectly visible.

The effect of the dichroic crystals, which are oriented in the Polaroid composition, is to screen out some light waves and to admit only those which are parallel to the line of vision. Polaroid is now available in disks 2, 4 and 10 in. in diameter and in sheets of unlimited sizes.

New Equipment in Brief

Axial Flow Pumps. The axial flow pump made by the Pennsylvania Pump Co., Easton, Pa., is designed for high efficiency at low head conditions. The pump consists of a tubular casing which forms part of the water passage, in which a propeller rotates, forcing water through the system. Irrigation and tunnel work, which involve large quantities at low heads, are among the services for which this pump is adaptable.

Reinforcing Lath. For suspended ceilings, tie-on partitions, and other types of tie-on work, the Reynolds Corp., New York City, has developed a new type of reinforcing lath, called slotted Ecod fabric. Similar to Ecod fabric, the new lath is slotted at regular intervals to permit tying. The fabric is furnished in sheets 8 ft. long, 1½ in. thick and 31 in. wide.

Constant Weight Feeder. A new constant weight feeder for continuously feeding and weighing materials at accurate rates has been announced by the Jeffrey Manufacturing Co., Columbus, Ohio. It consists of a vibrating feeder controlled electrically by a balanced weighing belt equipped with an adjustable counterpoise for setting the desired rate of discharge. All gates for regulating the flow of material are eliminated and weighing accuracy is obtained by the sensitiveness of the scale. Through its electrical control, the vibrating feeder is regulated to satisfy the weighing belt at all times and thus keep it in perfect operating balance.

Pipe Line Insulation. A new insulation known as Adsco Cell-Concrete, for underground steam and hot water pipe lines, possessing low heat conductivity, and the ability to retain its physical strength and shape as well as completely regain its insulating value after repeated submergence in water, is being offered by the American District Steam Co., North Tonawanda, N. Y. Adsco Cell-Concrete is made entirely from portland cement mixed with a foam, producing a light weight cellular concrete. It can be mixed on the job and poured around pipes in the conduits.

New Publications

BLAW-KNOX CONCRETE BUCKETS, Blaw-Knox Co., Pittsburgh, Pa. 8½x11, 15 pages.

MICRO-PROJECTORS, Bausch & Lomb Optical Co., Rochester, N. Y. 6x9, 15 pages.

EROSION, ITS PREVENTION AND CURE, The Dehevoise Co., Brooklyn, N. Y. 6x9, 12 pages. Erosion resistant paint.

PYRO OPTICAL PYROMETER, Pyrometer Instrument Co., New York City. 8½x11, 6 pages.

KINNEAR ROLLING DOORS, Kinnear Manufacturing Co., Columbus, Ohio. 8½x11, 32 pages.

TAYLOR FORGE WELDED PIPE, SPIRAL PIPE AND SEAMLESS STEEL FITTINGS, Taylor Forge & Pipe Works, Chicago, Ill. Catalogs 33, 36 and 34-1, 87, 39 and 64 pages, respectively.

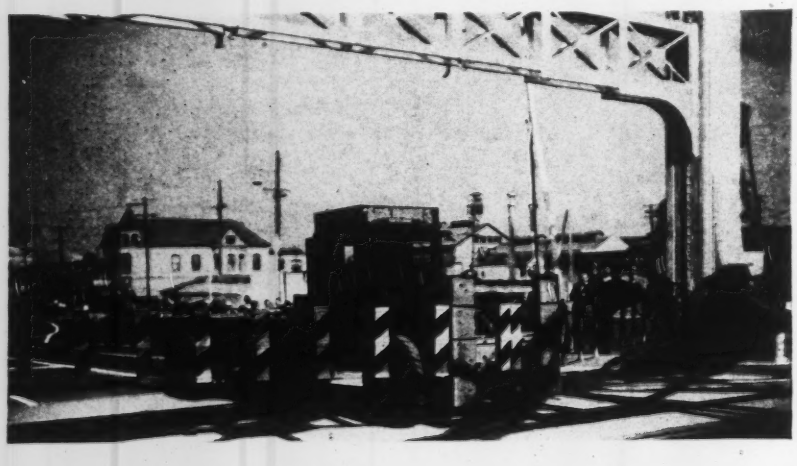
Business Notes

BABCOCK & WILCOX TUBE CO., Beaver Falls, Pa., announces the appointment of the Markham Supply Co., Chicago, Ill., as its general railway sales representative for the Chicago, St. Louis, Kansas City, Omaha, and Twin Cities territory.

THE BALTIMORE DIVISION AND BALTIMORE TUBE CO. DIVISION, Revere Copper and Brass, Inc., have been consolidated and hereafter will operate as the Baltimore Division. R. S. Stringer is vice-president of Revere's Baltimore Division and E. H. Hodges, sales manager.

THE INTERNATIONAL NICKEL CO., INC., New York City, has announced the addition of Thomas N. Armstrong, Jr., to the technical staff. Mr. Armstrong will handle the steel castings development. He was formerly associate metallurgist at the Norfolk Navy Yard.

TRACTOR & EQUIPMENT CO., Chicago, Ill., manufacturer's representative, is expanding into new headquarters at 431 S. Jefferson St. F. M. Mercer has been appointed sales manager.



CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Ill., Springfield—City rejected bids Jan. 6, water heating and air conditioning for new purification plant (nearing completion), at Lake Springfield. Will readvertise. Noted Dec. 26, C. D.—Jan. 2, E. N.-R.

Mo., Jefferson City — State, Capitol Bldg., making plans constructing filtration plant and distribution system for Missouri State Penitentiary. $100,000. W. D. Wideman, Hall Bldg., Kansas City, engr. C. A. Haskens, 406 Capitol Bldg., Jefferson City, superv. engr.

Mo., Mountain View—City, J. F. Duncan, mayor, soon takes bids waterworks and distribution system. $51,528. P.W.A. project. Beard Eng. Co., 44 South Central Ave., Clayton, engrs. Noted Sept. 9, C.D.—Sept. 12, E.N.-R.

N. Y., Freeport—Village election, Mar. 17, $200,000 bonds for constructing municipal water supply system. H. M. Wood, village engr. Noted Jan. 16, 1934, C. D.—Jan. 18, 1934, E. N.-R.

N. Y., Glens Falls—City, Water Dpt., City Hall, plans constructing dam and pumping station on Halfway Brook. $166,000. P.W.A. project. Whitman, Requard & Smith, West Biddle and Charles Sts., Baltimore, Md., engrs. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

N. C., Canton—Town filed application to P.W.A. for funds to finance construction of waterworks system. $150,000. Harwood & Beebe, Spartanburg, S. C., engrs. J. L. Reeves, mayor.

N. C., Mount Pleasant—Town, P.W.A. approved for water and sewerage systems. $87,272. G. C. White, Durham, engr.

N. C., Rich Square—Town filed application with P.W.A. for loan and grant to construct water and sewerage systems. E. W. Brown, mayor. $97,500. W. Freeman, High Point, engr.

O., Canton—See "Materials and Equipment."

Tex., Longview—City voted $250,000 bonds for waterworks.

Tex., Port Isabel—City, C. N. Scanlan, mayor, voted bonds for new waterworks system, incl. 100,000 gal. steel elevated tank, 50 ft. tower, filtration tank, probably chlorinator, distributing pipe mains. Est. $60,000. Engineer, c/o city engr. Noted Jan. 3, C. D.—Jan. 10, E. N.-R.

BIDS ASKED

Conn., Danbury—Feb. 26, by Danbury Waterworks Impvt. Comn., T. J. Bowen, secy., at City Clerk's Office, City Hall, filter plant, Contr. A; and general construction of pipe line, Contr. C. Plans and specifications may also be examined at office of C. M. Everett, 22 East 40th St., New York, civil engr.; adv. E. N.-R. Noted Jan. 30, C. D.—Feb. 6, E. N.-R.

Kan., Mound Valley—Feb. 27, by Mayor, constructing complete waterworks. $50,000. P.W.A. project. A. C. Moore, Joplin, Mo., engr. Noted Jan. 24, C.D.—Jan. 30, E.N.-R.

Mass., Westboro—See "Contracts Awarded."

†**N. Y., Bath**—Mar. 3, by Vet. Bu., Arlington Bldg., Wash., D. C., constructing water softening system at Veterans Facility.

†**N. Y., Canandaigua**—Mar. 3, by Vet. Bu., Arlington Bldg., Wash., D. C., water softening plant building addition and zeolite system at U. S. Veterans Facility.

N. Y., Lockport—See "Contracts Awarded."

N. Y., Mount Morris — See "Contracts Awarded."

N. Y., South Corning — See "Contracts Awarded."

★**O., Cincinnati**—Mar. 25, by H. F. Wagner, city purch. agt., reconditioning existing filter building and head house and constructing new additional filters, pipe lines, etc., 70,000 cu.yd. excav., 18,000 cu.yd. concrete, 245,000 units face brick, 4,000 cu.ft. cut stone, 60,000 sq.ft. terra cotta wall tile, 34,000 sq.ft. quarry floor tile. $1,250,000 plus. P.W.A. project. Burns & McDonnell, Kansas City, engr. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

Pa., Allentown—Feb. 25, by M. W. Gross, mayor, Contr. 1, c.i. pipe and special fittings; Contr. 2, gate valves and fire hydrants; Contr. 3, laying 22,550 ft. 6- to 30-in. Class B and C bell and spigot c.i. pipe together with installing of appurtenances connecting South Mt. and East Side distribution reservoirs to supply and distribution systems. $164,500. Morris Knowles, Inc., 507 Westinghouse Bldg., Pittsburgh, engrs.

Pa., McKeesport—Feb. 24, by City Clerk, 7,000 ft. water line pipe with fittings and accessories and necessary sewer line pipe with fittings and accessories in connection with proposed Jerome St. improvement. J. Richards, supt. Water Dpt., c/o A. Rankin, supt. Streets & Sewers, engr.

Wis., Milwaukee—Mar. 10, by Dpt. P. Wks., furnishing switchboard for water purification plant. P.W.A. project. R. E. Stoelting, comr.

CONTRACTS AWARDED

Calif., Los Angeles — Directors Metropolitan Water Dist., 306 West 3rd St., furnishing, erecting steel structures for West Portal Batching Plant, San Jacinto Tunnel, comprising furnishing structures, steel bins, conveyors, etc., Colorado River Aqueduct, Spec. 140, to Southwestern Eng. Co., 4800 Santa Fe Ave., $8,750. Bids Jan. 17.

Calif., Pasadena—City Clerk, Schedule 1, 36 in. centrifugal cast rein.-con. watermain, Sunset Ave., Mountain St. to Orange Grove Ave., Schedule 2, 30 in. in Wilson Ave. from Mountain St. to Villa St., Schedule 3, constructing 2,888 lin.ft. 6 in. c.i. watermain and 196 lin. ft. ¾, 1 and 2 in. service laterals, Huntington Dr. from Colorado to Blanche Sts., to Case Constr. Co., 1927 Thayer Ave., Los Angeles, $55,842. P.W.A. Bids Jan. 29, awarded Feb. 4. Noted Feb. 6, C. D.

★**Calif., San Francisco**—Public Utilities Comn., City Hall, constructing 10.5 mi. Crystal Springs Pipe Line 2, Sects. A and B, to Youdall Constr. Co., Matson Bldg., $846,159 and $469,182 respectively. Bids Feb. 5***laying 20 in. steel feeder mains in Park-Presidio Dist., to Lowrie Paving Co., 1540 16th St., $126,670. Bids Feb. 6***laying crosstown pipe line, consisting of 36 in. and 44 in. diam. steel pipe, installing 77,000 lb. fittings, etc., to Macdonald & Kahn, Financial Center Bldg., $193,995. Bids Feb. 4. Grand total $1,636,006. Awarded Feb. 11. Noted Feb. 7, 14 and 13, C.D.—and Feb. 13 and Jan. 23, E.N.-R. respectively.

Calif., Santa Barbara—City Council, constructing El Cielito Reservoir, to J. Oberg, 3470 East 8th St., Los Angeles, $29,800 est. $29,000; constructing La Mesa Reservoir, circular concrete structure, to N. Oakeson, Santa Barbara, $34,744 est. $32,363. P.W.A. Bids Feb. 4, awarded Feb. 6. Noted Feb. 10, C. D.

Calif., Vallejo—A. Edgecumbe, city clk., constructing 3 units of existing Gordon Valley Water transmission pipe line near Creston Station in Napa Co., and near Cordelia, Solano Co., involving replacement of 4,840 ft. 24 in. pipe line with 24 in. c.i. pipe, to R. B. McNair & H. Gould, 3745 Rhoda St., Oakland, $48,615 Est. $50,000. P.W.A. Bids Feb. 4, awarded Feb. 6. Noted Feb. 13, C.D.

Ga., Roswell—City, waterworks system, incl. c.i. main, elevated tank, valves, meters, hydrants, etc., to Richardson Trading Co., Blossburg, Ala., $36,494. Est. $67,000. P.W.A. Noted Jan. 29, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

Ga., Warwick—City, constructing deep well for waterworks, to W. S. Middlebrooks, Warwick, $1,312. P.W.A. J. B. Pullen, Warwick, engr.

Mass., Saugus—Town, Water Dpt., E. Homan, chn. Bd. Engineers, laying 12 in. waterwain in Main St., $12,000, laying and relaying c.i. watermain in Boston St., $25,000, day labor when projects mature. Appropriation asked.

Mass., Westboro—Town, C. J. Tyrell, chn. Bd. Selectmen, Town Hall, laying 12,000 ft. 12 in. c.i. water pipe, $20,000 and 3,900 ft. 10 in. vitr. clay sewer, $10,000, town labor, under W.P.A. Materials will be purchased by owner when project advances.

Mo., Galena—City, deep well and pump, to L. W. Ledyard, Baxter Springs, Kan., $4,254. P.W.A. Bids Jan. 15. Noted Jan. 8, C. D.—July 11, E. N.-R.

Mo., Oran—City, well and pump for waterworks, to E. M. Gould, Cape Girardeau, $2,988. P.W.A. Bids Jan. 13. Noted Jan. 8, C. D.

Mo., Oran — City, constructing 80,000 gal. rein.-con. reservoir, Contr. B, to Service Co., 528 Dwight Bldg., Kansas City, $38,264. P.W.A. Bids Jan. 13. Noted Jan. 8, C.D.

Mo., Stockton—City, deep well and pump for waterworks system, to Sewell Well Co., 3171 Portis Ave., St. Louis, $3,420. P.W.A. Bids Jan. 15. Noted Jan. 8, C. D.—Sept. 5, E. N.-R.

Neb., Elba — City, furnishing, installing deep well pump for waterworks, to Interstate Mchy. & Supply Co., 3857 Leavenworth St., Omaha, $715. P.W.A. Bids Dec. 13. Noted Dec. 19, C. D.

Neb., Elba — City, hydrants, valves and pumps, etc., for Sects. 4, 5, 7 and 9, to Interstate Mchy. & Supply Co., 3857 Leavenworth St., Omaha, $1,958. P.W.A. Bids Dec. 13. Noted Dec. 6, C. D.

N. J., Matawan—Matawan Twp., constructing water transmission mains and distribution mains in 2 sections of township, to A. S. Mundy, Inc., 52 Main St., Woodbridge, $40,555. Est. $50,909. P.W.A. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

N. J., Newfield — Boro, constructing water system, 2 unit wells and pumping station, Contr. 3, to F. J. Glueck, 1258 Commercial Trust Bldg., Phila., Pa., $18,604. Total est. $88,000. P.W.A. Noted Feb. 13 C. D.—Feb. 20, E. N.-R.

N. Y., Lockport—City, 6 in. c.i. watermain in North Adams St., $2,850; in Center Alley, $2,867; 6 in. c.i. main and 10 in. sewer in Center Alley, $2,852***relief sewer in Juniper St., $4,810; 6 in. c.i. main in Center St., $9,887; 15 in. sewer in Walnut St., $6,336; 12 in. sewer in Mill St., $8,331***sewer in Seymour Alley, $782, day labor. Grand total $38,714. W.P.A. J. Freshsee, city engr.

N. Y., Mount Morris — Village, improving municipal waterworks and reservoir, incl. rein.-con. end wall, paving, laying c.i. pipe, fittings, day labor. $25,015. W.P.A. project. Noted Oct. 31, C.D.—Nov. 7, E.N.-R.

N. Y., Red Hook—Village, waterworks, Contr. A, to U. S. Pipe & Fdry. Co., 71 Bway., New York; Contr. E, to Chicago Bridge & Iron Wks., 165 Bway., New York. Total est. $63,897. P.W.A. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

N. Y., South Corning—Village, constructing water distribution system, incl. 13,480 ft. c.i. pipe, specials, 19 gate valves and boxes, 28 fire hydrants, day labor. $34,255. W.P.A.

O., Bellevue—City, Contr. D of complete waterworks, to Lowensohn Constr. Co., 1740 East 12th St., Cleveland, $151,333. P.W.A.

O., Cincinnati—City, furnishing twenty 48x30 in., twenty 60x42 in., one 60x42 in. and six 60x42 in. hardesty type sluice gates, to Ohio Corrugated Culvert Co., Middletown, $5,297***40 direct acting rate of flow controllers for water purification plant, to Builders Iron Fdry., 9 Codding St., Providence, R. I., $55,580***two 60 in., two 48 in., ten 36 in., and five 24 in. geared gate valves, two 36 in. electric motor driven valves, eighty 30 in., forty 24 in. and forty 20 in., motor driven gate valves, two 42 in. increasing to 49 in. special valves, to Chapman Valve & Mfg. Co., Indian Orchard, Mass., $18,783***gate valves, to Koppers Constr. Co., Fort Wayne, Ind., $7,338*** c.i. pipe, fittings and special castings, to U. S. Pipe & Fdry. Co., Addyston (near Cincinnati), $262,502. Grand total $349,500. P.W.A. Noted Dec. 12, C. D.

O., Cincinnati—City, 1 story, basement, 85x100 ft. pumping station, at Western Hills plant, Queen City Ave., to David Gordon Building & Constr. Co., 3493 Burnett Ave., $112,500. Est. $101,000. P.W.A. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

O., Cincinnati—City, laying c.i. watermains in Eden Park and furnishing, laying section and discharge mains at Western Hills Pumping Station, incl. 108 ft. 36 in. and 444 ft. 30 in. c.i. pipe, 56 tons special castings, to O'Connel & Sweeney Kellogg and Tennyson Sts., $16,245 and $24,895 respectively. P.W.A. Noted Dec. 11, C.D.—Dec. 19, E.N.-R.

O., Dover — Mayor L. W. Helmkamp and Safety Service Dir. H. Keppler, awarded contract for four 80 ft. wells at 17th St. Waterworks, to Ohio Drilling Co., Massillon, $4,523. P.W.A.

Tex., Longview—City, c/o B. N. Taylor, mgr., waterworks, incl. reservoir, pipe line and addition to existing purification plant, to C. F. Lytle, 504 Nebraska St., Sioux City, Ia., $416,545. Est. $500,000. P.W.A. Bids Dec. 6, awarded Feb. 1. Noted Dec. 17, C.D.—Sept. 5, E. N.-R.

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Projects $500,000 and over symbol ★
Reports noted back to former issues are designated as follows:
C. D. Construction Daily
E. N.-R. Engineering News-Record
Federal Government projects symbol †

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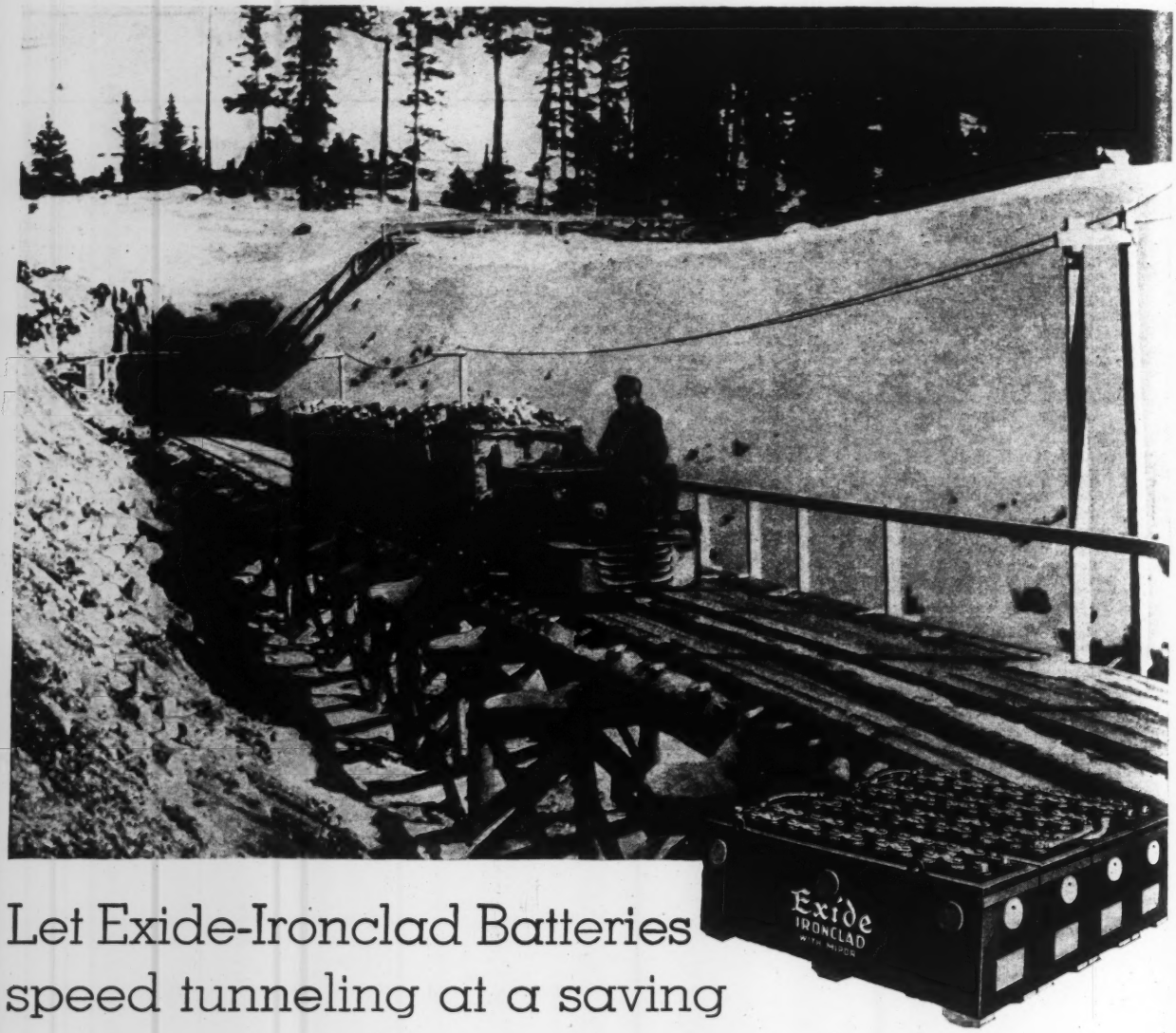

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Waterworks (Continued)

★ **Wis., Milwaukee**—City, filter equipment for water purification plant, to Pittsburgh Constr. Co., Diamond Bldg., Pittsburgh, Pa., $540,000. **P.W.A.** Bids Dec. 12, awarded Jan. 21. Noted Dec. 20, C. D.—Nov. 28, E. N.-R.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Fla., Lakeland—Election Mar. 17, $176,000 bonds, for sewers.

Ill., Chicago—Sanitary District of Chicago, 910 South Michigan Ave., rejected bids Jan. 9, constructing Southwest Sewage Treatment Works, incl. steam turbine driven units, Div. I; condensing equipment for steam turbine generator units, Div. J; feedwater heating equipment, Div. K; and power transformers, Div. L. Noted Jan. 14, C. D.

Ill., Galesburg—City plans sewers in Southwest Sewer Dist. and in Henderson Street Lateral. A. S. Richey, city engr.

Ill., Springfield—City plans cleaning and repairing branch sewers. $100,000. W.P.A. project. M. P. O'Brien, city engr.

Ind., Crawfordsville—Bd. P. Wks., C. D. Jones, clk., plans sewage disposal plant. $180,000. C. Hurd, 1039-41 Architects Bldg., Indianapolis, engr. Issuance of bonds to cover cost of project authorized.

Kan., Kansas City—See "Contracts Awarded."

Md., Baltimore—City making plans 4,685 ft. trunk line sewer in Hillin Rd. $211,000. Bureau of Sewers, Municipal Bldg., engrs.

Massachusetts—See "Public Buildings."

Mo., University City — City received no bids Jan. 13, constructing sewers in Canton-Hanley Joint Sewer Dist., $102,178, and in Sewer Dist. 69, $30,376. P.W.A. project. Will readvertise. Noted Jan. 8, C. D.—Dec. 26, E. N.-R.

N. C., Mount Pleasant—See "Waterworks."

N. C., Rich Square—See "Waterworks."

O., Columbus—City plans constructing sanitary sewer extending in Clermont and Indianola Aves., Cooke Rd., Canyon, Tenappe, Yaronia and Overbrook Drives, Indian Springs Dist., Contr. 59, Part 3, $68,000; 1 storm sewer extending in private property and Republic Ave. from McGuffey Rd. to Ontario Ave. in Ontario St. and McGuffey Rd. from Republic Ave. to Hudson St., in Hiawatha St. and Osceola Ave. from Akola Ave. to Hudson St., Hudson St. Dist. P.W.A. project. Contr. 65, Part 5, $37,000.

Tenn., Kenton—City indefinitely postponed plans for sewage disposal plant complete with equipment and auxiliary appurtenances, etc. No work will be done at this time. P.W.A. project. T. H. Allen, 65 McCall St., Memphis, engr. Noted Nov. 4, C. D.—Oct. 24, E. N.-R.

Tex., Houston—City, c/o O. F. Holecombe, mgr., soon takes bids Little White Oak Bayou Sanitary Sewer from Wrightwood Pumping Station to Link Rd. $150,000. P.W.A. project. J. M. Nagle, city engr.

Wis., Milwaukee—Sewerage Comn. plans concrete acidification tanks and brick superstructure for sewage purification plant addition, Jones Island. $50,000. P.W.A. project. J. L. Ferebee, ch. engr.

Wis., West Bend—City soon takes bids sewers to sewage disposal plant. Suhr, Berryman, Peterson & Suhr, 130 North Wells St., Chicago, Ill., engrs.

BIDS ASKED

Conn., West Haven (br. New Haven)—Town, bids about Mar. 14, 1 or more contracts in connection with sewage disposal plant. P.W.A. project. Noted Jan. 8, C. D.

Ill., Chicago—Feb. 27, by Sanitary District of Chicago, 910 South Michigan Ave., constructing Southwest Sewage Treatment Works, Div. P, incl. influent, effluent, sludge return, and miscellaneous conduits, service tunnel, chlorinator and condenser water screen house, and control structures, also Div. T, venturi meters; Div. U, valves and sluice gates; Div. V, air diffuser plates. P.W.A. project. J. J. Sullivan, clk.

Ill., East St. Louis—Mar. 23, by East Side Levee & Sanitary Dist., E. F. Harper, ch. engr., trunk line sanitary sewer to service Washington Park, Fairmont City, and Landsdown area. P.W.A. project. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

Kan., Greensburg—Feb. 28, by A. C. Reed, city clk., complete sewage disposal plant with equipment, auxiliary piping and appurtenances and connecting sanitary sewers, 45,000 lin.ft. 8 to 12 in. pipe, etc. $65,000. P.W.A. project. Paulette & Wilson, Farmers Union Bldg., Saline, engrs. Noted Feb. 5, C.D.—Feb. 13, E. N.-R.

La., New Orleans — Apr. 2, by Sewerage & Water Bd., 526 Carondelet St., furnishing valves for sewage station, 215-S. A. F. Theard, genl. supt. A. G. Moffatt, secy.; adv. E. N.-R., Feb. 20.

Md., Frederick—Feb. 27, by City, sewerage system. Whitman, Requardt & Smith, West Biddle and Charles Sts., Baltimore, engrs.

Mass., Winchester—Feb. 27, by Commonwealth of Massachusetts, Metropolitan Dist. Comn., W. E. Whittaker, secy., 20 Somerset St., Boston, Sect. 114, North Metropolitan Relief Sewer, P.W.A. Project 1098, consisting of approximately 6,268 ft. rein.-con. sewers. To exceed $100,000. Private plans by Sewer Division, F. D. Smith, ch. engr.

Mo., Webster Groves—Mar. 6, by City, constructing trunk line sanitary sewers in various streets in Webster Groves Sanitary Sewer Dist. P.W.A. project. J. B. Clayton, city engr.

Neb., Omaha—See "Contracts Awarded."

O., Columbus—Mar. 3, by P. W. Maetzel, engr., City Hall, storm sewer extending in private property and Republic Ave. from McGuffey Rd., to Ontario St., in Ontario St. and McGuffey Rd., from Republic Ave. to Hudson St. in Hiawatha St. and Osceola Ave. from Akola Ave. to Hudson St., Contr. 65, Part 5, for City. $37,000. P.W.A. project. Noted Feb. 5, C. D. —Feb. 13, E. N.-R.

Okla., Ada—See "Contracts Awarded."

Okla., Oklahoma City — See "Contracts Awarded."

N. Y., Dunkirk—See "Contracts Awarded."

Pa., Kittanning—Mar. 2, by Incorporate Boro of Kittanning, Council Chambers, 1,200 ft. 1st grade 12 in. Universal c.i. pipe or equal, 1,950 ft. 24 in., 800 ft. 24 in. DS terra cotta sewer pipe with suitable appurtenances. $36,311. W. G. Nye, 801 Market St., engr. Noted Oct. 23, C. D.—Oct. 31, E. N.-R.

Pa., McKeesport—See "Waterworks."

Wis., Oshkosh—City bids about Mar. 15, constructing High Street Intercepting Sewer. P.W.A. project. Former contract rescinded. Noted Feb. 4—C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

LOW BIDDERS

★ **Ill., Chicago**—Sanitary Dist. of Chicago, J. J. Sullivan, clk., Feb. 13, constructing West Towns Outlet sewer, Contr. 2, from McKay Eng. & Constr. Co., 228 North LaSalle St., $1,115,970. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

CONTRACTS AWARDED

Kan., Kansas City—City, 2,520 ft. 15- to 30-in. vitr. clay sewer in 31st St. and Brown Ave., relief labor. W.P.A. project. Noted Jan. 27, C.D.—Jan. 30, E.N.-R.

★ **Mich., Detroit** — Dpt. P. Wks., 104 City Hall, Sect. 2, Detroit Interceptor Sewer, 4,500 ft. in Jefferson Ave. from Military Ave. to Scotten Ave., concrete cylindrical section with connections, manholes, etc., to Blanck & Gargaro, 40 Seven Mile Rd. E., $635,131. P.W.A. Bids Jan. 24. Noted Jan. 9, C. D.—Jan. 16, E. N.-R.

Neb., Omaha—City, laying sewers in 21st and Oak Sts., 3rd and Grover Sts., 21st and Elm Sts., 16th St. and Carter Lake Blvd., and 56th and Miami Sts., 18th and Spencer Sts., relief labor. $100,000. W.P.A. project. D. F. McCauley, Bus Bldg., W.P.A. engr.

N. J., Bay Head—Boro, constructing sanitary sewer and pumping station, to Thomas Proctor & Co., 218 5th Ave., Long Branch, $23,455. P.W.A. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

N. J., Plainfield—Joint Meeting of Plainfield, North Plainfield and Dunellen, altering and constructing disposal plant, to Thomas Proctor Co., Inc., 212 North 5th St., Long Branch, $43,701. P.W.A. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

N. J., Manville—Boro, sanitary sewers, trunk sewers, pumping station and sewerage treatment plant, Contr. A, for piping only, to L. R. G. Contg. Co., 7 Watchung Ave., Plainfield. $138,240. Est. $350,000. P.W.A. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

N. Y., Dunkirk—City, cleaning 35 mi. sewerage system, day labor. $56,918. W.P.A. Will purchase sewer cleaning equipment. A. G. Walter, city engr.

N. Y., Lockport—See "Waterworks."

★ **N. Y., Niagara Falls**—City, sewage disposal plant and sewerage system, tunnels, Contr. 3, to F. Canuso & Son, 804 South 12th St., Phila., Pa. Est. $2,000,000. Award subject to P.W.A. approval. Noted Feb. 4, C. D.—Jan. 23, E. N.-R.

N. D., McClusky — City, constructing 10,686 lin.ft. 6 and 8 in. sanitary sewerage systems and disposal plant, 16 manholes, 15 lampholes, etc., by day labor. Est. about $50,000. $7,000 bond issue approved. Material purchased through local dealers. Work under way. W.P.A. T. R. Atkinson, Bismarck, engr.

O., Columbus—City, completion Contr. 14, in Olentangy-Scioto Dist., Sect. 10, incl. 1,450 ft. 6- to 15-in. vitr. clay pipe, to Kahill Co., 4161 West 150th St., Cleveland, $71,389. Est. $68,319. P.W.A.

Okla, Ada—City, constructing 8,900 ft. 8 and 10 in. concrete lateral sewers in Southeast Sewer District, day labor, $30,000. W.P.A. R. F. Ferguson, city engr.

Okla., Oklahoma City—City constructing 9,100 ft. 8 in. vitr. clay sanitary sewers in Winnifeld addition, own forces. $28,200. W.P.A. project. L. M. Bush, city engr.

Ore., Oswego—City Council, constructing new sewerage system, to Gilpin Constr. Co., Henry Bldg., Portland, $116,434. Bids Jan. 27. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

Tex., Goldthwaite—City, c/o H. G. Bodkin, mayor, complete sanitary sewerage system, incl. 33,545 lin.ft. 4- to 8-in. vitr. tile pipe, manholes, cleanouts, 1 sewage disposal plant complete, etc., to E. L. Dalton, Dallas Bank Bldg., Dallas, $44,625. P.W.A. Bids Dec. 14.

Va., Berryville—City, sewerage system and disposal plant to W. C. Spratt, Fredericksburg, $51,051. Bids Feb. 6. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

Man., Winnipeg—Greater Winnipeg Sanitary Dist., constructing sewers across Red River at Marion St., Ash St., Ft. Douglas, Hart and Monroe Aves. and Main St., to Nelson River Constr. Co. Ltd., 607 Union Trust Bldg., $69,462.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

★ **Calif., San Francisco** — State, California Toll Bridge Authority, 500 Sansome St., plans by T. Pflueger, 580 Market St., and A. J. Brown, Jr., 251 Kearny St., both San Francisco, and J. J. Donovan, 950 Parker St., Oakland, bay bridge terminal, 3 story, basement, 164x700 ft. structural steel, rein.-con. construction, train platforms with access to 6 tracks, 20 ft. above street level, waiting rooms, concession quarters, etc., Mission St. between Beale and 2nd Sts., in connection with San Francisco-Oakland Bay Bridge over San Francisco Bay, connecting San Francisco and Alameda Counties. Est. $6,300,000. Total cost $15,000,000, involving construction of electric railroad system on bridge and interurban terminal facilities in San Francisco, as follows: San Francisco Terminal and approach viaducts, $6,300,000; track work on main bridge, $640,000; East Bay eteriare yard and connections, $860,000; connections to S. P. East Bay lines, $600,000; electrical distributing system, $720,000; signals and interlocking, $1,320,000; alterations to equipment and off-line changes, incl. Key system, $2,470,000; Southern Pacific, $1,536,000; Sacramento-Northern, $54,000; interest during construction, $500,000. C. H. Purcell, 500 Sansome St., engr.

Conn., Bridgeport—City Bridge Comn. plans repairing old bridge, Congress St. $68,000. C. L. Nord, State Office Bldg., Hartford, state hy. engr. F. Toquet, City Hall, city engr. State Hy. Dpt. will supervise and engineer project.

Ill., Chicago—Cook Co. soon takes bids 3 span, 150 ft. rein.-con. bridge, constructing bridge over North Branch of Chicago River, on Tower Rd. in New Trier Twp. $75,000. G. A. Quinlan, engr.

Iowa—State Hy. Comn., Ames, rejected bids Dec. 10, bridges in Audubon, Lyon and Osceola Counties. F. R. White, ch. engr. Noted Nov. 25, C. D.—Nov. 28, E. N.-R.

Iowa—State Hy. Comn., Ames, rejected bids Jan. 7, bridges and culverts in Black Hawk, Cass, Pottawattamie, Des Moines, Fayette, Keokuk, Lyon, Osceola and Page Counties. Noted Jan. 26, C. D.—Jan. 2, E. N.-R.

Iowa — State Hy. Comn., Ames, soon takes bids constructing 18 rein.-con. box and 12 rein.-con. pipe culverts on relocation of U. S. Road 6, through Davenport and Bettendorff, Scott Co. F. R. White, ch. engr.

Missouri—State Hy. Comn., Jefferson, rejected bids Nov. 8 bridges in Texas Co. Noted Nov. 7, C. D.

Missouri—State Hy. Comn., Jefferson City, rejected bids Jan. 31, bridges in Chariton and Nodaway Counties. Noted Jan. 22, C. D.

★ **Mo., St. Louis**—Bd. P. Serv., B. L. Brown, pres., City Hall, and State Hy. Dpt., Jefferson City, soon takes bids constructing rein.-con. viaducts to carry DeBaluviere, Hamilton and Waterman Aves. across tracks of Wabash R.R., incl. depressing tracks, approaches, structures, etc. $650,000. P.W.A. project. T. H. Cutler, state hy. engr.

Nevada—State Hy. Dpt., Carson City, completing plans bridge 1 mi. south of Gardnerville, Douglas Co., incl. 3,300 cu.yd. roadway excav., 380 cu.yd. structural excav. R. A. Allen, Heroes Memorial Bldg., Carson City, engr.

★ **N. J., Cape May C. H.**—Cape May Co., 3 bridges on 2 sites, $1,500,000, P.W.A. funds applied for but no allocation can be made until Congress appropriates more P.W.A. funds Project deferred until such time. Noted Apr. 22, C. D.—Apr. 25, E. N.-R.

N. Y., Tonawanda—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, plans constructing concrete, steel grade crossing elimination, $250,000. Plans to be released about Apr. 1. Noted Nov. 17, 1933, C. D.—Nov. 23, 1933, E. N.-R.

North Carolina—State Hy. and P. Wks. Comn., Raleigh, plans constructing fixed bridge over Northeast Cape Fear River at Chinquapin, Project 2222, Duplin Co. To exceed $30,000. W. V. Baise, Raleigh, engr.

Ohio—J. J. Jaster, Jr., hy. dir., Columbus, received no bid Feb. 4, constructing deck plate girder viaduct over Black River and concrete paving approaches, State Hy. 555, Route 254, Cleveland-Lorain Rd., Lorain Co., $294,346. Will readvertise. Noted Jan. 21, C. D.—Jan. 25, E. N.-R., under "Streets and Roads."

O., Cleveland—Great Lakes Exposition Co., 1893 Terminal Lake Erie Tower, making plans one 60 ft. and one 100 ft. steel girders and heavy timber temporary bridges on East 9th St. at Lake Erie Tower. Walker & Weeks, 2341 Carnegie Ave., engrs.

Texas—See "Unclassified."

Texas—State Hy. Comn., H. Hines, chn., Austin, plans G. C. and S. F. R.R. underpass and approaches on feeder road, Hy. "F."

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†*Federal Government.*

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Bridges, etc. (Continued)

W.P.G.S. 830, Denton Co., $23,000; T. and P. R.R. overpass and approaches on Hy. 15, W.P.G.H. 634-B, Tarrant Co. New P.W.A. project.

Tex., San Antonio—City, C. K. Quin, mayor, plans vehicular bridge over San Antonio River, at Mitchell St. $25,000. J. W. Beretta Engineers, Inc., National Bank of Commerce Bldg., engrs.

★ **Wash. Tacoma**—Pierce Co., revised applications for P.W.A. funds has been made but funds not yet granted for 5,000 ft. toll bridge over Puget Sound Narrows. $4,000,000. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

Ont., Kingston — Frontenac Co. soon takes bids constructing overhead bridge over Canadian Pacific and Canadian National Rys., on Division St. Est. about $35,000. J. E. Goodman, Court House, engr.

BIDS ASKED

Arkansas—Feb. 27, by State Hy. Com., Little Rock, steel, concrete bridge, incl. grading, minor drainage structures, bituminous on gravel surfacing 6 mi. Decatur-Gravette Rd., Benton Co., $100,000; concrete, steel underpass, grading, concrete paving 0.2 mi. approaches, Waveland-Blue Mountain Rd., Yell Co., $40,000. W. W. Zass, Little Rock, engr.

Arkansas—See "Streets and Roads."

★ **Connecticut**—Mar. 9, at office of J. A. Macdonald, state hy. comr., Hartford, two 600 ft. steel arches on concrete piers and 28 plate girder approach spans over Connecticut River, between Middletown and Portland. Est. $3,000,000. R. W. Stevens, State Hy. Dpt., Hartford, engr.

Conn., Bridgeport—See "Contracts Awarded."

★ **Ill., Chicago**—Mar. 3, by Chicago Park Dist., Burnham Park, constructing superstructure and steel work and underground drainage for Outer Drive Bridge approaches at Burnham Park, retaining wall along the Randolph St. extension in Grant Park, incl. 70 ft. bascule bridge over Michigan Canal. $2,000,000. W. I. Bell, Burnham Park, engr.

Md., Frederick—Feb. 27, by City, Contr. 4, 95 ft. concrete, steel bridge, Whitman, Requardt & Smith, West Biddle and Charles Sts., Baltimore, engrs. Noted Jan. 2, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

New Jersey—Mar. 2, by E. D. Sterner, state hy. comr., at office State Hy. Dpt., Trenton, constructing extension bridge and approaches carrying Route 33, Sect. 3B, across tracks of New Jersey Southern R.R. near Shark River (Collingswood Park) Station, Monmouth Co., incl. 655 cu.yd. excav., 48,000 lb. structural steel, 12,400 lb. reinforcing steel in structure; adv. E. N.-R., Feb. 20.

★ **New York** — Mar. 10, by A. W. Brandt, comr. Hys., Albany, constructing 80 ft. concrete girder bridges and approaches on Andover-Alfred Station-Almond Rd., RC 2369 and 3729, Allegany Co., $35,754; 140 ft. truss and 7 I-beam approach spans on Jamestown City-Fairmount Ave., WPG-M C36-7, Chautauqua Co., $230,245; 43 and 65 ft. girders and 50 ft. I-beam bridge on Guilford Rd. and Rockwell Mills-South New Berlin Rd., WPSS RC 3736, Chenango Co., $93,266***34 ft. timber trestle, Bridge 4, Fraser-West Delhi-Treadwell Rd., 16 ft. slab culvert 40 Holmes Hollow Rd., 15 ft. Culvert 47, Southerland Rd., 45 ft. timber trestle on Bridge 48-Elk Creek Rd., 21 ft. slab Bridge 2, Delhi-Leotona Rd., on WPSO SS 36-7, Delaware Co., $32,407; 30 and 40 ft. I-beam bridge and 4 approaches, Delaware River Rd. and Delhi-Bloomville Rd., RC 2370 and 3730, Delaware Co., $52,070; 2 span girder bridge over New York Central R.R., on Saugerties-Kingston Rd., Part 2, WPGH RC 3738, Ulster Co., $146,783; 21 ft. slab concrete approaches White Creek-County Line Rd., RC 2371, and ER-RC 3733, Washington Co., $20,268. Total $610,792.

Pennsylvania—Mar. 6, by W. Van Dyke, secy. Hys., Harrisburg, rein.-con. bridge, grading, drainage 893 ft. R-19065, Sect. 1, Pine Twp., Columbia Co., incl. 3,853 cu.yd. Class 1, 90 cu.yd. Class 2 excav.; plate girder overpass bridge, dual type paving, etc. 590 ft. R-180, Sect. 5, Ridley Park Borough, Delaware Co., 1,947 cu.yd. Class 1 and 1,212 cu.yd. Class 2 excav.; erecting complete encased I-beam overpass bridge, having 30 ft. clear span, etc., 2,056 ft. R-23022, Middletown Twp., Delaware Co., 6,415 cu.yd. Class 1 and 1,490 cu.yd. Class 2 excav.; through steel truss bridge, rein.-con. paving 1,950 ft. R-103, Sect. 2, Elkland Twp., Elkland Borough, Tioga Co., 1,088 cu.yd. Class 1, 1,571 cu.yd. Class 2, 12,138 cu.yd. borrow excav.; reconstructing bridge floor of existing bridge and resurfacing existing brick pavement with bituminous surface 250 ft. R-95, Warren Borough, Warren Co., 45 cu.yd. Class 2 excav.

Tennessee—See "Streets and Roads."

Va., West Point—Feb. 25, by Dpt. Hys., Richmond, constructing 2,252 ft. bridge over Pamunkey River, Route 4, State Project WPSS-346-B, Fed. Project WPSS-436-B, King William and New Kent Counties.

Washington—See "Streets and Roads."

Wis., West Allis—Mar. 6, by State Hy. Comm., Madison, constructing South 92nd Street

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Overhead, incl. 558 cu.yd. Class A and [illegible] cu.yd. Class X concrete; 52,500 lb. reinforcing steel, 172,750 lb. structural steel.

CONTRACTS AWARDED

Arkansas—See "Streets and Roads."

California—State Hy. Comm., P. Wks. Bldg., Sacramento, constructing steel truss swing bridge over Potato Slough on Lodi-Isleton Rd., incl. grading, road mix surfacing 0.25 mi. roadway, San Joaquin Co., to Bodenhamer Constr. Co., Box 67, Oakland, $171,870. Bids Jan. 8, awarded Feb. 10. Noted Jan. 16, C. D.

California—J. F. Knapp, general contractor, 1401 Park Ave., Oakland, piles in connection with construction overhead crossing over tracks of Southern Pacific R.R., near El Cerrito Rd., Albany, Alameda Co., to Raymond Concrete Pile Co., 333 Montgomery St., San Francisco, for State Hy. Comm., Sacramento***prestressed concrete, to C. S. Hughes Co., 1001 Addison Ave., Berkeley***reinforcing steel, to Truscon Steel Co., 604 Mission St., San Francisco***lumber, to Tilden Lumber Co., 400 High St., Oakland. Noted Dec. 3, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

California—J. F. Knapp, general contractor, 1401 Park Ave., Oakland, reinforcing steel in connection with construction of undergrade crossing at Peralta St., Adeline St., and San Pablo Ave., in cities of Oakland and Emeryville, Alameda Co., to Soule Steel Co., 1750 Army St., San Francisco, for State Hy. Comm., C. H. Purcell, engr., P. Wks. Bldg., Sacramento***concrete, to Transit Concrete Co., 2500 Peralta St., Oakland***electrical work, to Auto Electric & Mechanical Co., 467 O'Farrell St., San Francisco***lumber, to Tilden Lumber Co., 400 High St., Oakland. Noted Oct. 21, C. D.—Oct. 24, E. N.-R., under "Contracts Awarded."

California — Lindgren & Swinerton, general contractors, 225 Bush St., San Francisco, asphalt, aggregate and screenings in connection with construction of undergrade crossing under tracks of Sacramento Northern R.R. at Broadway Terrace, Oakland, Alameda Co., for State Hy. Comm., Sacramento, to Ransome Co., 4030 Hollis St., Emeryville***structural steel, to Bethlehem Steel Corp., 20th and Illinois Sts., San Francisco***reinforcing steel, to W. S. Wetenhall Co., 17th and Wisconsin Sts., San Francisco. Noted Jan. 13, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

California—Lindgren-Swinerton, Inc., general contractors, 225 Bush St., San Francisco, roadway excavation in connection with construction of overhead crossing over tracks of Southern Pacific R.R., ½ mi. east of Tracy, San Joaquin Co., to C. Wood, 2224 Lakeside Dr., Stockton, for State Hy. Comm., Sacramento***structural steel, to Pacific Coast Steel Corp., 20th and Illinois Sts., San Francisco***installing only reinforcing steel, to J. P. Murphy, 3901 Mission St., San Francisco***liquid asphalt and screenings, to Heafey-Moore Co., 344 High St., Oakland***driving piles, to P. Sinnock, 147 West Scotts St., Stockton. Noted Jan. 2, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Calif., Ventura — Bd. Supervs. Ventura Co., constructing timber, steel bridge, Beach Rd. and Santa Clara River, Ventura Co., to V. R. Dennis Constr. Co., 3911 5th Ave., San Diego, $121,950. Subject to P.W.A. approval. Bids Feb. 7. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

Conn., Bridgeport—City, P. W. Rodman, comptroller, replacing rein.-con. bridge, 32 ft., State St. extension, $30,432; 50 ft. rein.-con. bridge, 24 ft., Capitol Ave., $10,000; 50 ft. rein.-con. bridge, 24 ft., Anton St., $10,000. W.P.A. labor. Grand total $49,632. P. Brewster, dir. P. Wks.

Florida—State Road Dpt., Tallahassee, overhead crossing over L. and N. R.R. tracks on Rd. 1, Holmes Co., to Cornell-Young Co., Macon, Ga., $37,834***overpass over S. A. L. and A. C. L. tracks on Rd. 2, Alachua Co., to Coggin & McDermott, Chipley, Fla., $53,096***approaches to overhead crossing on Rd. 2, Alachua Co., to MacVay-Lindsay Constr. Co., Panama City, $105,069. Grand total $195,999. Bids Jan. 3. Noted Jan. 16, C. D.

Illinois—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, constructing substructure and concrete and rail for bridge in St. Clair Co., to Richardson Constr. Co., Decatur, $40,991 and $24,288 respectively***structural steel for same bridge, to Ben Hur Constr. Co., Springfield, $10,601***furnishing steel for same project, to St. Louis Structural Steel Co., East St. Louis, $42,724***painting same bridge, to Overland Constr. Co., 205 West Wacker Dr., Chicago, $2,232***concrete rail for viaduct, Pike Co., to Ben Harrison Constr. Co., Jacksonville, $30,681***furnishing structural steel for bridge in St. Clair Co., to Midland Structural Steel Co., Cicero, $51,862***concrete floor for same viaduct to Blackwell Corp., East St. Louis, $15,406***erecting structural steel for same viaduct, to Oscar Daniels Co., 135 South LaSalle St., Chicago, $22,029***5 bridges in McLean Co., to General Paving Co., Champaign, $5,130. Grand total $292,924. Bids Nov. 27, Jan. 17. Noted Jan. 9 and 24, C. D.

Illinois—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, constructing substructure subway in Macoupin Co., and 2 bridges and substructure in Logan and Tazewell Counties, to Otto Randolph, Inc., 53 West Jackson Blvd., Chicago, $19,490 and $26,438 respectively***substruc-

†*Federal Government.*

Bridges etc. (Continued)

...ture in St. Clair Co., to Thorpe Rogoff Co., 306 South Wabash Ave., Chicago, $26,268***bridge in Effingham Co., to A. Culbertson, Pana, $7,-643***3 bridges, Woodford Co., to Riber, Gibbons & Neville Dwight, $22,027***viaduct in Canton Co., to H. H. Hall Constr. Co., East St. Louis, $17,325***substructure subway in Perry Co., to H. E. Cawood, Mount Vernon, $29,402 ***viaduct in Carroll Co., to A. Olson Constr. Co., Waterloo, Ia., $34,163***subway in Macoupin Co., to Cunningham Bros., Sumner, $15,-261***substructure for viaduct in Pike Co., to Christy Birt Co., Decatur, $38,521. Grand total $237,208. Bids Nov. 8, Dec. 6, 13. Noted Nov. 20 and Dec. 6, C. D.

★**Kan. Topeka**—Office of State Hy. Comm., Topeka, 7 span 5,000 ft. steel superstructure, 6 concrete piers over Kansas River, to Missouri Valley Bridge & Iron Co., Leavenworth, $660,000. Bids Jan. 30. Noted Jan. 21. C. D.—Jan. 23, E. N.-R.

★**Ky., Louisville** — City, constructing grade crossing elimination project at several heavily trafficed streets, to Henry Bickel Co., 435 Garden St., $1,190,556. Bids Dec. 20. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

Mass., New Bedford—City, G. H. Nye, city engr., rebuilding steel superstructure of Coggleshall St. Bridge, to Boston Bridge Wks., Inc., 6th and Binney Sts., Cambridge, $32,178. Est. $29,000. P.W.A. Bids Jan. 13, awarded Feb. 5. Noted Jan. 20, C. D.—Jan. 9, E. N.-R.

Mississippi—See "Streets and Roads."

Neb., Chappell—Duel Co., bridge, to Inland Constr. Co., 3867 Leavenworth St., Omaha, $42,738; guard rails, to Third City Sand Co., Grand Island, $538.

New York—See "Streets and Roads."

★**New York** — Triborough Bridge Authority, 111 8th Ave., New York, paving and completing anchorages of East River Crossing, Triborough Bridge connecting Manhattan, Bronx and Queens Boro., Contr. 60, to A. A. Volk Co., 1819 Bway., New York, $749,513. P.W.A. Bids Feb. 11. Noted Feb. 3, C. D.—Jan. 30, E. N.-R.

N. Y., Farmersville—Pennsylvania R.R. Co., W. D. Wiggins, acting ch. engr., Broad Street Bank Bldg., Phila., Pa., eliminating Napier Crossing on Franklinville-Machias Hy., to Rust Eng. Co., Market Street Bank Bldg., Phila., Pa., $76,818. Est. $99,700. Noted Jan. 10, 1933, C. D.—Jan. 12, 1933, E. N.-R.

N. Y., Newark—**New York Central R.R. Co.**, J. W. Pfau, ch. engr., 466 Lexington Ave., New York, eliminating grade crossing, Main St., to Walsh Constr. Co., Jerald Bldg., Syracuse, $127,-621. Bids Jan. 21. Noted Jan. 28, C. D.

N. Y., New York—Doyle & Doyle, Inc., general contractors, 72 Carmen St., Scarsdale, 120 tons reinforcing steel for 232nd Street Bridge over Henry Hudson Parkway, for Henry Hudson Parkway Authority, Arsenal Bldg., Central Park, to Fireproofing Products Co., 536 East 133rd St., New York. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

North Carolina—See "Streets and Roads."

Ohio—See "Streets and Roads."

Oregon—See "Streets and Roads."

Pennsylvania—See "Streets and Roads."

Pennsylvania—Dpt. Hys., Harrisburg, 500 ft. plate girder bridge and bituminous on native stone surfacing, Route 49016, Mt. Carmel Twp., Northumberland Co., to F. D. Kessler, 138 Queen St., Northumberland, $40,576. Bids Jan. 10. Noted Jan. 15, C. D.—Jan. 23, E. N.-R., under "Streets and Roads."

Pa., Nanticoke—See "Streets and Roads."

Texas—G. Gilchrist, state hy. engr., Austin, to Thomas & Ratliff, Rogers, constructing I. & G. N.R.R. underpass and approaches, Hy. 43, WPGH 394-A, Milam Co., $53,910 est. $60,-000***to Russ Mitchell, Inc., 2701 Texas Ave., Houston, widening T. and N. O. Ry. underpass, Hy. No. 3, WPGH 511-J and Control 27-9-9, Harris Co., $67,450 est. $70,000***to Austin Bridge & Road Co., 1813 Clarence St., Dallas, constructing H. E. & W. T. R.R. overpass, etc., Hy. 35, WPGH 224-D, Shelby Co., $82,631 est. $80,000; constructing T. & N. O. R.R. underpass and roadway approaches, Hy. 3, WPGH 645-D, Culberson Co., $52,706 est. $50,-000***to E. Loyd, Box 1077, Fort Worth, H. E. and W. T. R.R. overpass and roadway approaches, Hy. 3, WPGH 201-B, Part 4, Nacogdoches Co., $46,642 est. $40,000***to Uvalde Constr. Co., Santa Fe Bldg., Dallas, T. & P. R.R. underpass and approaches, Hy. 160, WPGH 707-B, Grayson Co., $30,271, est. $30,000. Grand total $333,610. Bids Dec. 20. New P.W.A. Noted Jan. 3, C. D.

Wisconsin—State Hy. Comm., Madison, structures in Rock Co., to L. Schroeder, Cashton, $30,074***overheads in Milwaukee Co., and in LaCrosse Co., to Worden Allen Co., P. O. Box 2057, Milwaukee, $192,613 and $152,801 respectively***structures in Eau Claire Co., to L. G. Arnold, Inc., Eau Claire, $19,883. Grand total $395,381. Bids Feb. 4. Noted Feb. 7, C. D.—Jan. 23, E. N.-R.

Wyoming—See "Streets and Roads."

STREETS AND ROADS

BIDS ASKED

Alabama — State Hy. Comm., c/o G. Scott, pres., Montgomery, rejected bids Dec. 4, grading, draining, stone or slag surfacing and concrete bridges on 2.233 mi. of Cullman-Holley Pond Rd., WPSO 399, Cullman Co. Noted Nov. 29, C. D.

†**Arizona**—Feb. 27, by Pub. Rds., Phoenix, base course surfacing 12.696 mi. Oak Creek Natl. Forest Hy., Coconino Natl. Forest, Coconino Co. C. H. Sweetser, dist. engr.

Arkansas — Feb. 27, by State Hy. Comm., Little Rock, grading, drainage structures, traffic service gravel surfacing 7 mi. DeWitt and Crocketts Bluff Rd., Arkansas Co., 35,794 cu.yd. earth excav., $40,000; grading, minor drainage structures, gravel surfacing 4.8 mi. Heber Springs Rd., Cleburne Co., 31,423 cu.yd. excav., $40,000; 1.3 mi. hy. Hy. 65, Faulkner Co., 5,612 cu.yd. excav., $20,000; 9 mi. Greenbrier-Centerville Rd., Faulkner Co., 12,155 cu.yd. earth excav., $40,000; grading, minor drainage structures, bituminous on gravel surfacing 2 mi. Hy. 62, Baxter Co., $5,476 cu.yd. excav., $40,000; concrete paving 0.8 mi. Hy. 67, White Co., $20,000; 8.7 mi. same hy., $100,000; grading, blacktop surfacing 2.4 mi. Hy. 72, Benton Co.; grading, gravel surfacing, treated timber bridge 1.3 mi. county road west of Gentry, Benton Co.

Ill., Peoria—Feb. 27, by Pleasure Driveway & Park Dist., W. W. Pape, supt., special assessments, paving, $57,000. P.W.A. project.

Indiana—Mar. 3, by State Hy. Comm., Indianapolis, bituminous tread paving 12.04 mi. Markel to Bluffton, R-1306, Project 601 A, Huntington and Wells Counties; rein.-con. paving 0.396 mi. South Madison Ave., Greenwood, R-1328, N.R.M. 3C, Johnson Co.; rein.-con., bituminous concrete or rock asphalt paving 0.232 mi. Morgan Ave., east of Fares Ave., Evansville, F.A. 16; 1.534 mi. Fares Ave., north from Columbia St., Evansville, F.A. 36, both Vanderburgh Co.: grading and structures 8.247 mi. road from point 2.5 mi. south of West Lebannon to U. S. 41, R-1313, F.A. 3-7, B, Warren Co.: rein.-con. paving 1.238 mi. Lincolnway in New Haven and to west, R-1334, Allen Co.; 4.611 mi. feeder road from S.R. 23 to U. S. 20 west of South Bend, R-1336, St. Joseph Co.: 1.506 mi. feeder road, S.R. 2 to U.S. 20, R-1339, WPSO 588A, St. Joseph's and Elkhart Counties; stone or graveling 2.717 mi. from S.R. 135 to Crandall Co. R.-1335, Project 480B, Harrison Co.: bituminous surface treating and stone or gravel surfacing 6.275 mi. feeder road, Jamestown to point 2 mi. north of Advance, WPSO and WPMS 553 A; 7.187 mi. feeder roads, 2 mi. north of Advance to Thorntown, WPSO and WPMS, 553 B, both Boone Co.; rein.-con. and rock asphalt paving 2.254 mi. road from Murray and Clinton Sts., Fort Wayne, to South City limits, Allen Co. J. D. Adams, state hy. comr.

Iowa—State Hy. Comm., Ames, rejected bids Jan. 7, improving roads in Black Hawk, Cass, Pottawattamie, Des Moines, Fayette, Keokuk and Clinton Counties. Noted Dec. 26, C. D.—Jan. 2, E. N.-R.

Iowa—State Hy. Comm., Ames, rejected bids Dec. 10, grading road in Audubon, Lyon and Osceola Counties; surfacing road in Clinton and Iowa Counties. F. R. White, state hy. engr. Noted Nov. 25, C. D.—Nov. 28, E. N.-R.

Kansas—Feb. 28, by State Hy. Comm. at office of County Clerk, Great Bend, resurfacing, sand graveling for cover material, 194.7 mi. hys. in Barton, Butler, Harper, Kiowa, Pratt, Rise, Rush, Sumner and Sedgwick Counties.

Louisiana — Feb. 26 (extended date), by Louisiana Hy. Comm., Baton Rouge, grading, gravel surfacing 5 mi. Chataigner N. and S. W. on 1144 and 1145 in Evangeline Parish.

Louisiana—Mar. 4, by State Hy. Comm., gravel surfacing 8 mi. Hornbeck-Longville Hy., Route 403, Project 808-A-1: Vernon and Sabine Parishes; grading, gravel surfacing 6.046 mi. Verot School-Intersection Route 43, and Milton Hy. on Route C-1421 and 538, Project 1116, Lafayette Parish; 8 mi. Group 2 hys., Project 1128, Jefferson Davis Parish; grading, local iron ore surfacing 2.971 mi. Carlton-Pleasant Valley Church Hy., Route C1424, Project 1120, Ouachita Parish.

Missouri—State Hy. Comm., Jefferson City, rejected bids Jan. 31, improving roads in Pulaski, Nodaway, Henry, Howard, Morgan, Vernon, Cedar and Chariton Counties. Noted Jan. 22, C. D.

Missouri—State Hy. Dpt., Jefferson City, rejected bids Dec. 6, improving roads in Bollinger, Perry and Madison Counties. Noted Nov. 27, C. D.

Missouri — State Hy. Comm., Jefferson City, rejected bids Nov. 8, improving roads in Texas Co. Noted Oct. 30, C. D.

Mo., St. Joseph—City rejected bids Dec. 18, grading, curbing, draining, concrete paving Sacramento, Center, Sherman and James Sts. P.W.A. project. Will readvertise. H. B. Judson, city engr. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

Neb., Omaha—See "Contracts Awarded."

Nevada—See "Contracts Awarded."

New York—Mar. 10, by A. W. Brandt, comr. Hy., Albany, concrete paving 2.1 mi. Albany-Watervliet Rd., RC 3735, Albany Co., $106,606 ***roadside improvement Darien-Center-Alexander Rd. Part 2, S.H. 1661, Alexander Canawangus Rd. Part 1, same road Part 2; same road Part 3, LeRoy-Pavilion Rd., Part 2, WPH

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†*Federal Government.*

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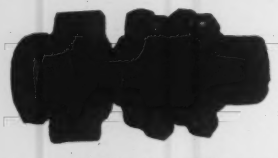

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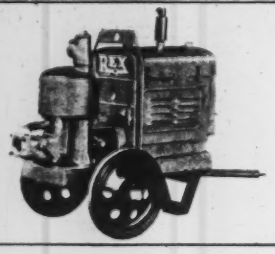

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Streets and Roads (Continued)

R.C. 3734, Genesee Co., $84,997; Fayetteville-Chittenango Rd. Part 2; Chittenango-Oneida Rd. Parts 1 and 2; Wampsville-Oneida Castle Rd. RC3731, Madison Co., $19,048; Clifton Park-Crescent Rd. Parts 1 and 2, Clifton Park-Round Lake Rd. Parts 1 and 2, Mechaniesville-Malta Rd., WPH 3737, Saratoga Co., $30,144 ***New Paltz-Plattekill Rd., New Paltz-Rifton Rd., Rosendale Perrines Bridge Rd. and Rosendale Village Rd. RC 3732, Ulster Co., $37,142. Total $277,937.

N. Y., Geneseo—See "Contracts Awarded."

Ohio—Feb. 25, by J. J. Jaster, Jr., Ohio Hy. Dir., Columbus, grading, drainage structures traffic bound paving 2.496 mi. Wattsville-Salineville Rd. County Rd. 21, Carroll Co., $19,532; improving roadside 4.359 mi. part Sect. B-1 and part Sect. B-2, Canton Cleveland Rd., State Hy. 460, Route 43, Cuyahoga Co., $12,799; 0.644 mi. part Sect. C. and Hamilton Sect., Hamilton Cleves Rd., State Hy. 44, Route 128, Butler Co., $1,819; 2.526 mi. part Sect. C. Maumee Northern Rd., State Hy. 696, Route 20-N, Lucas Co., $4,019; 2.239 mi. Sect. A, Toledo Western Rd., State Hy. 537, Route 246, Lucas Co., $3,887; 0.439 mi. Proposal 1, part Monroeville Sect., Bellevue-Norwalk Rd., State Hy. 289, Route 20, Huron Co., $3,105; 0.175 mi. Proposal 2, same road, $227; 0.313 mi. Proposal 1, Medina Sect. East Akron Medina Rd., State Hy. 95, Route 18, Medina Co., $269; 1.833 mi. Proposal 2, same road, $5,333; 0.361 mi. Proposal 3, same road, $1,558. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

★ **Oregon**—R. H. Baldock, engr., State Hy. Comm., Portland, bids in March, extending Union Ave. to Ross Island Bridge. $750,000.

Pennsylvania—Mar. 6, by W. Van Dyke, secy. Hys., Harrisburg, bituminous on native stone surfacing 1.240 ft. R-07023, Altoona City, Blair Co., involving 3,073 cu.yd. Class 1 excav.; 6,292 ft. R-14-28, Sect. 3, Marion Twp.; drainage, bituminous on native stone surfacing 6,758 ft. R-869, Sect. 2, Rush Twp., both Centre Co.; rein.-con. paving, incl. rein.-con. structure extension, widening shoulders, pipe extensions, etc. 17,357 ft. R-854, Sect. R-4, P-276, Munster and Cresson Twps., Cresson Borough, Sect. R-1-B, Cambria Co., 81,189 cu.yd. Class 1 and 460 cu.yd. Class 2 excav.; rein.-con. paving and rein.-con bridge 4,718 ft. R-276, Sect. 5-B-1, Portage and Washington Twps., Cambria Co., 85,413 cu.yd. Class 1 and 373 cu.yd. Class 2 excav.; rein.-con. paving 23,903 ft. R-200, Sect. 3, Athens and Bloomfield Twps., Crawford Co., 82,856 cu.yd. Class 1, 4,231 cu.yd. Class 2, and 1,648 cu.yd. borrow excav.; bituminous on crushed aggregate surfacing 1.210 ft. R-197, Sect. 4, L. Frederick Twp., Montgomery Co., 21,947 cu.yd. Class 1 excav., etc.; rein.-con. paving, extending rein.-con. bridge, 1,526 ft. R-3, Sect. 1-A, Cooper and Montour Twps., Montour and Columbia Counties, 1,807 cu.yd. Class 1, 28 cu.yd. Class 2 and 138 cu.yd. borrow excav.; bituminous on native stone surfacing, 6 rein.-con. structures 33,734 ft. RO263, Sect. 2, Franklin and Liberty Twps., Susquehanna Co., 82,864 cu.yd. Class 1, 1,847 cu.yd. Class 2 and 3,654 cu.yd. borrow excav.

Pa., Indiana—See "Contracts Awarded."

Pa., Lock Haven—See "Contracts Awarded."

Pa., Nanticoke—See "Contracts Awarded."

Tennessee—Feb. 28, by State Dpt. Hys. & P. Wks., Nashville, roadside development of 5.43 mi. State Hy. 15, N.R.H. 3-A, reopened, Franklin Co.; reconstructing 3.448 mi. Hy. 7, F.A.P. 25, Giles Co.; grading, drainage, paving 0.426 mi. State Hy. 9, N.R.M. 77-H, Campbell Co.; grading, drainage 2.086 mi. State Hy. 41, W.P.H. 265-B, Sumner Co.; 1.64 mi. State Hy. 113, F.A.P. 283-C, Sequatchie Co.; 2.673 mi. State Hy. 50, W.P.S.S. 294-C, Lincoln Co; 1.829 mi. State Hy. 52, W.P.S.S. 406-F, Fentress Co.; 6.794 mi. State Hy. 50, N.R.S. 424-A, Maury Co.; 4.824 mi. non-system hy., W.P.S.O. 430-A, Obion Co.; widening, resurfacing 5.499 mi. State Hy. 1, WMPH 41, Knox Co.; constructing overhead and approaches over G. M. and N. R.R. on State Hy. 100, W.P.G.H. 417-C, Chester Co.

Virginia—Mar. 3, by State Hy. Dpt., Richmond, macadam paving 0.8 mi. Route 12, WPMS-381-M1, Fed. Project WPMS-558-A, Page Co., 719 cu.yd. excav.; 1.5 mi. Route 29, State Project 472-I, 574-A3, Fed. Project 379-FG, Amherst Co., 9,901 cu.yd. excav.; macadam paving and grade crossing elimination Route 340, State Project WPGH-581-R1, 2, B1, State Project WPGH 382-AB, Clarke Co., 53,567 cu.yd. excav.; 0.07 mi. Route 340, State Project WPMS-593-M1, Fed. Project WPMS-592-A, in Winchester, 2,463 cu.yd. excav.; 0.2 mi. Route 460, State Project WPGH-679-DB3, Fed. Project WPGH-37-U3, Bedford Co., 696 cu.yd. excav.; 0.1 mi. Route 11, State Project 710-M2, 3 State Project 536-C, Washington Co., 837 cu.yd. excav.; 4.7 mi. Route 65, NRS-1010-ACD, Fed. Project NRS-434-AB, Rev., Lee Co.; 9.9 mi. Route 70, State Project WPSS-1121-A, WPSS-527-A, Dickenson Co., 17,904 cu.yd. excav.; curbing, guttering 0.2 mi. Route 17-360, State Project WPMH-418-M1, 2, Fed. ProjectWPMH-316-C, 359-C, in Tappahannock Co.; 0.4 mi. Route 11, State Project WPMH-425-G1 and WPMH 536-E, Wythe Co.; grading, draining Project WPMH-418-M1, 2, Fed. Project WPMH-M3, Fed. Project WPMH 313-I, in Greensville, 240 cu.yd. excav.; concrete paving 1 mi. Route 17, State Project WPSS-652-GW1, Fed. Project WPSS-532-A, Norfolk Co., 2,463 cu.yd. excav.-

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Washington—Mar. 3, by L. V. M... Hys., Olympia, cement and asphalt ... paving 6.1 mi. State Rd. 5, ... Tacoma, Federal Aid Project, 185 ... Co., incl. 25,740 cu.yd. excav.; grading ... stone surfacing 6 mi. State Rd. 7 ... South, Federal Aid 139-E, Lincoln ... cu.yd. excav.; 337 ft. rein.-con. brid... street and county road, Okanogan R... U. S. Wks, Project WPMS 251-A, ... Co., 900 cu.yd. excav.

Wash., Seattle—Mar. 9, by Comrs. ... grading, graveling and crib wall, ... mi., Puget Sound Marine View Hy. ... to Salt Water Park Bridge, $29,000. ... 26, C.D.—July 4, E.N.-R.

CONTRACTS AWARDED

Ariz., Tucson—City, cut-back asphalt ... 3rd, 5th and 2nd Aves., to White & ... Mary's Rd., $75,682. Est. $100,127. ... Bids Dec. 20. Noted Feb. 4, C. D. — ... E. N.-R.

Arkansas—State Hy. Dpt., Little R... ing, rein.-con. bridge, drainage, bitumin... gravel surfacing 5.6 mi. hy. north ... of Marianna, Lee Co., to A. C. Kennedy, ... $76,514 est. $80,000***grading, drainage, ... surfacing 9.5 mi. Walnut Ridge-Paragould Rd., Hy. 25, Greene Co., to Batson Bros., Jonesboro, $63,306 est. $100,000***4.3 mi. Lincoln-Natural Rd., No. 62 Hy., Washington Co., to Roy Tanner Paving Co., Tuloma Bldg., Tulsa, Okla., $20,497 est. $20,000***grading, drainage, bituminous on gravel surfacing 4.7 mi. Silver Springs-Gentry Rd., Hy. 12, Benton Co., to Consolidated Constr. Co., Tulsa, Okla., $50,111 est. $60,000. Grand total $211,428. Bids Jan. 20. State Hy. Dpt., Little Rock, did not receive bids Jan. 20, grading, drainage timber bridge 14 mi. Gentry-West Rd., Benton Co., $20,000 grading, bituminous on crushed stone surfacing 6.1 mi. Hot Springs West Rd., Hy. 270, to Garland Co., $60,000. Bids Jan. 30. Noted Jan. 22 and 24, C. D.

California—Dpt. P. Wks., Div. Hys., Sacramento, grading, road mix surfacing 7.3 mi. hy. between Big Pine and Keough Hot Springs, Inyo Co., to Basich Bros., 20530 Normandie Ave., Torrance, $109,721. Bids Jan. 29, awarded Feb. 5. Noted Jan. 31, C. D.

Florida—See "Bridges and Grade Crossings."

Illinois—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, paving 0.75 mi. road in Macon Co. to Birt Bros. Constr. Co., Decatur, $41,522*** road in Carroll Co., to Gund Graham Co., Freeport, $60,831***0.51 mi. St. Clair Co., and 1.58 mi. Jackson Co., to S. J. Groves & Sons Co., Libertyville, $79,661 and $23,764 respectively***1.45 mi. Cook Co., to State Improvement Co., 160 North LaSalle St., Chicago, $139,966 ***0.55 mi. Cook Co., to J. A. McGarry & Co., 189 North Madison St., Chicago, $7,148 ***5.02 mi. McLean Co., to E. R. Kelley Construction Co., Mattoon, $39,915. Grand total $437,173. Bids Nov. 27, Dec. 20 and 3 and 17. Noted Jan. 19 and 24, C. D.

★ **Illinois**—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, traffic bound paving ... mi. Marion Co., to G. R. Barr, Rochester, Ind., $66,855***grading 1.26 mi. Peoria Co., to Rocho Bros., Peoria, $23,854***2.89 mi. Bond Co., to Pickus Eng. & Constr. Co., 38 South Dearborn St., Chicago, $58,485***4.02 mi. Logan and Tazewell Counties, to O'Connell Constr. Co., Springfield, $71,437***0.17 mi. Clinton Co., to Tritt Bros., Belleville, $9,38 ***2.84 mi. Logan Co., to F. F. Wier Construction Co., Moline, $34,167***0.79 mi. Cook Co., to 0.03 mi. Cook Co., to J. A. Sackley Co., 4... Belmont Ave., Chicago, $147,921 and $8... respectively***widening approach, Carroll Co., to St. Clair Constr. Co., Wheaton, $3,982*** 1.07 mi. Cook Co., to Marquette Constr. Co., 4726 North Winchester Ave., Chicago, $144,8... ***1.2 mi. Cook Co., to Allied Bridge Constr. Co., Chicago, $86,276***0.93 mi. Cook Co., to Milburn Bros., Inc., Mount Prospect, $7... 100***0.37 mi. Macoupin Co., to Wankel Constr. Co., Morton Grove, $14,882***1.4 mi. Pike Co., to McCarthy Improvement Co., Davenport, Ia., $59,294. Grand total $808,325. Bids Nov. 8, 27, Dec. 6, 13, 20 and 23. Noted Nov. 14 and 14, and Dec. 13, C. D.

Indiana—State Hy. Comm., Indianapolis, constructing bridge in Miami Co., to E. F. Smith, 3907 North Penn St., Indianapolis, $119,988 est. $143,808***2 bridges in Monroe Co., to R. E. Garber, Converse, $57,163 est. $57,76... ***3 span, 165 ft. rein.-con. arch bridge in Cambridge City, to J. R. Gates, Fort Wayne, $76,999 est. $97,259. Grand total $254,14... Bids Oct. 22, awarded Feb. 5. Noted Nov. 7, C. D.—Dec. 5, E. N.-R.

Louisiana—State Hy. Comm., Baton Rouge, ... Barber Bros. Contg. Co., Baton Rouge, concrete paving 9.012 mi. Tangipahoa-Miss. State Line Hy., Route 33, Project 6205-B, Tangipahoa Parish, $241,909; 3.2 mi. Donaldsonville-White Castle Hy., Route 168, Project 330[illegible] Ascension Parish, $73,690; grading, gravel surfacing 2.5 mi. Watson-Amite River Hy., Route 103, Project 1125, Livingston Parish, $6,42... ***to Forcum-James Co., Dyersburg, Tenn., ... mi. Longstreet-Belle Bowe Hy., Route 1[illegible] Project 1123, De Soto Parish, $7,097***... Flenniken Constr. Co., Shreveport, ... grading 8.607 mi. Eden-Fellowship-Jena Hy., Route C-1415, 1416 and 1417, Project 1107, La Salle Parish, $34,447***to Doullut & Ewin, Q and C Bldg., New Orleans, 4.81 mi. Jonesville School-Intersection Route 16, Hy. 593, Project 840-A, West Carroll Parish, $39,638***to W. B. Aldrich & Co., Baton Rouge, 1.57 mi. Inter...

†*Federal Government*

Streets and Roads (Continued)

tion R... 5-Intersection Route 40, Route 770, Proje... 127, St. Landry Parish, $6,671***to W. T. ...arton, Sulphur, shell surfacing 17 mi. Hacke... Intersection Route 292 Hy., Route 104, P...ject 188-A-3, Cameron Parish, $59,304. Grand total $469,076. Bids Jan. 29. State Hy. Comm., Baton Rouge, rejected bids Jan. 29 grading, gravel surfacing 5 mi. McGinty-East Hy., Route C-1412, Project 1126, Morehouse Parish, 7.263 mi. Couley-St. Maurice Hy., Route 480, Project 1084, Winn Parish; 2.512 mi. Hi...e-Intersection Route 166, Route C-1391, Project 1069, Jackson Parish. Noted Feb. 10. C.D.—Jan. 16, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, grading, local iron ore surfacing 6.645 mi Derry-Gorum Hy., Project 903-A, Natchitoches Parish, to Monroe Constr. Co., Monroe, $56,535 ***4 mi. Simsboro-Springhill Hy., Project 900-A, Lincoln Parish, to Larance & Henry, Dubach, $15,700***grading, washed gravel surfacing 7.8 mi. Wisner-Kendricks Ferry Hy., Project 1113, Franklin Parish, to Wimberly Constr. Co., Arcadia, $38,576***2.272 mi. Intersection Route 256-Intersection Route 882, Project 1118, East Baton Rouge Parish, and 10.297 mi. Intersection Route 46-Oldfield Hy., Project 1083, to R. B. Tyler Co., 1446 Levering St., Louisville, Ky., $5,687 and $29,375 respectively***8.826 mi. Singer-Longville Hy., Route 285, Project 896-A, Beauregard Parish, and reef shell surfacing 13.37 mi. hys., Routes C-1427, C-1428, 117, 1205 and 1022, Project 1129, Acadia Parish, to Nelson Bros., Baton Rouge, $55,943 and $53,472 respectively***grading, reef shell surface course paving 2.251 mi. Intersection Route C-1352, Vincent School Hy., Project 1106, Calcasieu Parish, and 4 mi. Route 42-West Hy., Project 1075, Calcasieu Parish, to W. T. Burton, Sulphur, $11,247 and $20,705 respectively ***grading, sand clay gravel surfacing 3.939 mi. Zachary Bridge-Overflow Creek Hy., Project 1115, Morehouse Parish, to C. E. and R. A. Carpenter, Bastrop, $14,195***grading, gravel surfacing 6 mi. Mamou-Fenris Intersection Route 221 Hy., Route 570, Project 1119, Evangeline Parish, to W. R. Aldrich & Co., Baton Rouge, $27,412. Grand total $328,886. Bids Jan. 22. Grading and shell surfacing 2 mi. Himalaya-Percle Hy. on Route C-1420, Project 1071, Assumption Parish, to be done be hy. forces. Noted Jan. 28, C. D.—Jan. 9 and 16, E. N.-R.

Louisiana—State Hy. Dpt., Baton Rouge, grading, gravel surfacing 2 mi. Terrebonne Parish, to Louisiana Materials Co., Inc., 1510 Julia St., New Orleans, $7,466***5.8 mi. Bienville Parish, to Flenniken Constr. Co., Shreveport, $15,833*** grading, washed gravel surfacing 7 mi. Webster Parish to Hornsby & Glover, Bossier, $26,443***grading, local iron ore surfacing 2.5 mi. De Soto Parish, and concrete paving 5.94 mi. Lafourche Parish, to Forcum-James Co., Dyersburg, Tenn., $5,371 and $145,714 respectively*** grading, gravel surfacing 6.979 mi. Natchitoches Parish, to Hodgkin-Adams Co., Winchester, Ky., $36,599 ***3 mi. Allen Parish and 5 mi. West Carroll Parish, to Barber Bros. Constr. Co., Baton Rouge, $12,853 and $22,497 respectively*** 6.61 mi. Beauregard Parish, to A. A. Fuller Constr. Co., De Ridder, $54,715***washed gravel surfacing 8.134 mi. Washington Parish, to Green Bros. Gravel Co., Franklinton, $14,693***4 mi. Tangipahoa Parish, to M. L. Hoffman, Jr., Madisonville, $11,151. Grand total $353,335. Bids Jan. 15. Noted Jan. 23, C.D.—Jan. 9, E.N.-R.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, penolithic type surfacing Design 2, 16,497 ft. F.A., Project 258, Bourne, to Eastern Constr. Co., 666 Southern Artery, Quincy, $303,077. Bids Jan. 28, awarded Feb. 12. Noted Feb. 3, C. D.—Jan. 28, E. N.-R.

★ **Mississippi**—E. D. Kenna, dir. Hys., State Hy. Comn., Jackson, to Council & Lewy, Greenville, grading, drainage structures 11.642 mi. Hattiesburg-Seminary Hy., Covington and Forest Counties, $155,496 est. $190,000***to Pittsburgh-Des Moines Steel Co., Des Moines, Ia., grading, drainage structures, bridging 0.482 mi. Perkinston-Wiggins Hy., Stone Co., $53,080 est. $50,000***to J. Oman, Jr., Acklen Park, Nashville, Tenn., 6.565 mi. New Albany Hy., Union Co., $84,605 est. $67,000***to Vinnennes Steel Corp., Vincennes, Ind., grading, drainage structures, bridging, temporary gravel surface course 0.995 mi. Egrement-Rolling Fork Hy., Sharkey Co., $28,316 est. $28,000; grading, drainage structures, bridging, gravel surfacing 0.567 mi. Egrement-Rolling Fork Hy., Sharkey Co., $81,443 est. $80,000***to Burdine Constr. Co., Shaw, grading, drainage structures, paving 2.939 mi. Natchez-Vicksburg Hy., Adams Co., $68,365 est. $70,000***to C. Weaver, Jr., Jackson, and W. L. Sharpe, Memphis, Tenn., drainage structures, grading 1.591 mi. New Albany-Myrtle Hy., Union Co., $13,745 est. $18,000***to Hodgkin-Adams Constr. Co., Winchester, Ky., grading, drainage structures, bridging, bituminous surfacing 0.451 mi. Brookhaven-Wesson Hy., Lincoln and Copiah Counties, $30,845 est. $35,000; 1.081 mi. Brookhaven-Wesson Hy., Copiah Co., $38,657 est. $45,000***to Cobb Bros. Constr. Co., Meridian, grading, drainage structures, bituminous surfacing 2.752 mi. Brookhaven-Monticello Hy., Lawrence Co., 57,280; drainage structures, paving 1.272 mi. Meridian-Laurel Hy., Lauderdale Co., $38,561 est. $60,000***to Lamberth Landscaping Co., Shreveport, La., roadside improvement and beautification 5.109 mi. Jackson-Vicksburg Hy., Warren Co., $8,589 est. $10,000***to W. W. Easley, Magnolia, grading, drainage structures, gravel surface course paving 0.379 mi. Gillisburg-Magnolia Hy., Pike Co., $3,656 est. $0,000***to Shuptrine Constr. Co., Duncan, grading, drainage structures, gravel surfacing, bridging 3.169 mi. Stringtown-Choctaw Hy., Bolivar Co., $39,597 est. $31,000. Grand total $702,235. Bids Feb. 4. E. D. Kenna, dir. State Hy. Comn., Jackson, rejected bids Feb. 4, improving 3.96 mi. Philadelphia-Columbus Hy., Neshoba Co.; 7.842 mi. Hattiesburg-Seminary Hy., Forrest Co.; 0.055 mi. Jackson-Grandon Hy., Rankin Co., 0.201 mi. Greenwood-Minter City Hy., Leflore Co.; 0.13 mi. Oxford-Batesville Hy., Lafayette Co. Noted Jan. 28, C. D.

Mo., St. Louis — Bd. P. Service, City Hall, asphaltic concrete paving Haven St., to Perkinson Bros. Constr. Co., 3237 Carter Ave., $33,682***refined rough asphalt repaving 13th and Pine Sts., to Webb Boone Paving Co., 5103 Fyler Ave., $4,148 and $17,960 respectively. Grand total $55,791. **P.W.A.** Bids Jan. 28. Noted Feb. 5, C. D.—Jan. 16, E. N.-R.

Neb., Humphrey — City, paving, to Robert Constr. Co., Lincoln, $49,324. **P.W.A.**

Neb., Omaha — City, brick resurfacing California St. from 20th to 36th Sts., relief labor, $131,000. **W.P.A.** project. D. F. McVauley, Bus Bldg., W.P.A. engr.

Nevada—State Hy. Dpt., Carson City, grading, curbing, guttering, oil surfacing highway from Carson City to Cemetery and Montain St. from Robinson to Caroline Sts., and crushed graveling 2 mi. Peckham Lane between junction with Route 3 and point 2 mi. east, Washoe Co., day labor, $39,500 and $19,000 respectively. Work started. R. A. Allen, Carson City, state hy. engr.

Nevada—State Hy. Comn., Carson City, grading, curbing, guttering, walks, road-mix surfacing between Carson City and cemetery, Ormeby Co., $29,500; crushed gravel or stone surfacing in Peckham Lane, Washoe Co., $19,000, day labor. R. A. Allen, state hy. engr.

Nevada—State Hy. Comn., Carson City, constructing 0.98 mi. road in Elko Co., to Gibbons & Reed Co., 165 East 4th St., Salt Lake City, Utah, $58,800; 12.6 mi. road in Nye Co., to Dodge Constr. Co., Fallon, $52,085. Bids Jan. 31. Noted Jan. 28, C. D.

★ **New York**—A. E. Brandt, comr. Hys., Albany, improving 4.31 mi. road in Cattaraugus Co., to Canty O'Neill & Candell, Inc., Root Bldg., Buffalo, $43,738***0.14 mi. Cortland Co., to H. M. Strong & Son, Whitney Point, $11,304***0.37 mi. Lewis Co., to Lord-Humphrey & Co., Inc., Malone, $24,486***5.19 mi. Wayne Co., to Warren Bros. Roads Co., Cambridge, Mass., $290,755***0.7 mi. Erie Co., to C. B. Whitmore Co., Lockport, $49,855*** 0.17 mi. Cortland Co., to H. M. Bolton, Geneva, $26,191***0.33 mi. Chenango Co., to J. F. Paddelford, Sherburne, $37,867***bridge in Chenango Co., to Wertz Co., Albany, $13,298*** bridges in Allegany Co., to W. L. Collins, Hornell, $29,029. Grand total $526,523. Bids Jan. 28. Noted Feb. 3, C. D.

N. Y., Geneseo—Livingston Co., repairing and improving 1.5 mi. Hoes and Jones Rds., Conesus, $9,130; grading, graveling, bituminous paving 25,000 ft. Temple and Oak Sts., Avon, $22,306***reconstructing Barber Hill Rd. from Willard Gray to Van Buskirk Rds., Groveland, $23,831***grading, ditching, graveling, culverts Creek Rd., in Mount Morris, $14,218, day labor. Grand total $69,485. **W.P.A.**

North Carolina—State Hy. Comn. and Dpt. P. Wks., Raleigh, grading, sand bituminous sand mix surfacing 6.61 mi. County Project 145, Martin Co., to Hardaway Constr. Co., Georgia Home Bldg., Columbus, Ga., $69,767; structures on same road, to J. M. Gregory, Raleigh, $6,502. Bids Jan. 28, awarded Feb. 10. Noted Feb. 3, C. D.—Jan. 23, E. N.-R.

North Carolina—State Hy. & P. Wks., Raleigh **(P. means Project)**, to F. D. Cline, Raleigh, concrete widening 0.85 mi. P. 1549, Martin Co., $8,970***to Cobb & Homewood, Chapel Hill, 0.78 mi. P. 1861, Pitt Co., $12,001; concrete pavement and underpass 0.34 mi. P. 4643, Person Co., $43,437; structures 4.22 mi. P. 5565, Montgomery Co., $6,436***to E. W. Grannis, Fayetteville, grading, artificial sand clay surfacing 9.76 mi. P. 2320, Greene and Pitt Counties, $52,771***to J. M. Gregory, Raleigh, structures on same project, $30,000***to Gregory-Chandler Co., Inc., Virgilina, Va., approaches and underpass over S. A. L. R.R., on 1.05 mi. hy. in Sanford, P. 4470, Lee Co., $80,977***to Ames & Webb, Inc., Raleigh, approaches and underpass under S. A. L. and Southern R.R., 4.15 mi. hy. west of Raleigh, P. 4822, Wake Co., $47,758***to Lavender Bros., Earl, grading, traffic bound macadam surfacing 4.22 mi. P. 5565, Montgomery Co., $47,275. Grand total $329,625. Bids Jan. 28, State Hy. and P. Wks., Raleigh, held in abeyance projects for grading, sand bituminous road mix surfacing 6.61 mi. Project 145, Martin Co., and overhead crossing over Southern R.R., near China Grove, Project 6151, Rowan Co. Noted Feb. 3, C. D.—Jan. 23, E. N.-R.

Ohio—J. J. Jaster, Jr., Hy. Dir., Columbus, grading, drainage structures, retaining walls, concrete paving 0.88 mi. Sect. Chesapeake and part Sect. O of Ohio River Rd., Lawrence Co., to 4V. L. Johnson Constr. Co., 611 High St., Hicksville, $102,742***grading, traffic bound paving, constructing 3 span timber bridge over Huff Run, 0.084 mi. Tuscarawas Co., to Rohe Constr. Co., 2820 Eleventh St. N.W., Canton,

Federal Government: *Constr. News page 121*

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Streets and Roads (Continued)

$4,546***grading, drainage structures, traffic bound paving 0.383 mi. New Cumberland Station, Tuscarawas Co., to J. C. O'Conner & Sons, Inc., 2104 Miner St., Fort Wayne, Ind., $11,962***grading, drainage structures, cold mixed paving 2.943 mi. Union Co., to Robert Dienst, 297 South High St., Columbus, $108,600. Grand total $227,850. Noted Jan. 30, C. D.—Feb. 6.

O., Hamilton—Comrs. Butler Co., grading, resurfacing 2.5 mi. Buckley and Stahlheber Rds., incl. 10,000 cu.yd. excav., to F. B. Constr. Co., Hamilton, $23,748***furnishing, placing crushed slag surfacing 45 mi. county roads, to L. P. Cavett Co., 325 Wyoming Ave., Cincinnati, $96,882. **P.W.A.**

Oregon—State Hy. Comn., Portland, paving Clatsop Co., to Brookfield Constr. Co., Astoria, $30,580***Multnomah Co., to Warren Northwest Co. and Porter Yett, $41,935***oiling Tillamook Co., to J. C. Compton, McMinnville, $11,411***bridge in Lake Co., to J. F. Johnston, Newberg, $14,973***bridge in Clackamas Co., to Mountain States Constr. Co., Eugene, $83,903***boring 1,300 ft. tunnel at Arch Cape, Clatsop Section Oregon Coast Hy., to Orino Berkemeier Saramal, Cascade Locks, $166,904. Grand total $349,706. Bids Feb. 6. Noted Jan. 31, C. D.

★ **Oregon**—State Hy. Comn., Portland, reconstructing 4.6 mi. East Side Pacific Hy. from Salem south, to R. L. Houk, Independence, $95,931***reconstructing Rex Hill Sect., West Side Pacific Hy., to Oregon Contg. Co., and T. Arenz, 10509 Sandy St., Portland, $176,221***grading, bituminous surfacing Merrill-California Line Sect., Merrill-Hatfield Rd., and Malin-California Line Sect., Dallas California Hy., and trestle and culvert on Merrill-Hargield Rd., and 6.74 mi. Dairy-Bonanza Hy., to Dunn & Baker, Klamath Falls, $107,334 and $30,782 respectively***grading, surfacing north and south approaches Coos Bay Bridge, to S. S. Montague, 43 Southeast Salmon St., Portland, $102,638***paving 3.19 mi. Multnomah Co., to Jacobsen-Jensen Co., 517 Southeast Santon St., Portland, $42,639***overhead crossing below Linnton, to Portland Gravel Co., 35 Southeast Salmon St., Portland, $42,500. Grand total $598,046. Bids Feb. 7. Rejected bids Feb. 7, oiling road in Multnomah Co., will readvertise. Noted Jan. 31, C. D.

Pennsylvania—Dpt. Hys., Harrisburg, resurfacing, widening, surfacing, patching, removal and replacing existing pavement 2.45 mi. R-3 and 4, Columbia Co., to Suburban Constr. Co., Devon, $24,486. Bids Nov. 1, awarded Jan. 27. Noted Oct. 22, C. D.—Oct. 24, E. N.-R.

Pennsylvania — Dpt. Hys., Harrisburg, bituminous on native stone surfacing 0.38 mi. Lackawanna Co., and 0.22 mi. Pike Co., to Tyler & Cole, Meshoppen, $9,200 and $4,454 respectively***rein.-con. paving 0.35 mi. and rein.-con. bridge, bituminous on native stone surfacing, Lawrence Co., to New Castle Duntile Co., 1409 Moravia St., New Castle, $32,918***constructing plate girder bridge, encased I-beam bridge, rein.-con. paving, bituminous on crushed stone surfacing 0.58 mi. Montgomery Co., to Yoe Constr. Co., Chestnut Hill, $161,258***bituminous on modified or native stone surfacing 0.29 mi. Northumberland Co., to Donaghmore Coal & Stone Co., 1218 Chestnut St., Lebanon, $6,112***rein.-con. paving 0.55 mi. Clinton Co., to Central Builders Supply Co., Sunbury, $31,439. Grand total $245,381. Bids Jan. 17. Noted Jan. 22, C.D.—Jan. 30, E.N.-R.

Pennsylvania—Dpt. Hys., Harrisburg, 0.35 mi. rein.-con. paving, extension 2 existing bridges, Mercer Co., to M. H. Parish, 614 Plaza Bldg., Pittsburgh, $20,124***bituminous on native stone surfacing rein.-con. structure, grading approach, Potter Co., to C. H. Fry, 1902 Cherry St., Erie, $24,002***400 ft. plain cement rubble masonry and plain concrete retaining wall, Tioga Co., to Graham Constr. Co., Box 31, Lancaster, $11,529. Grand total $56,655. Bids Jan. 3. Rejected bids Jan. 3 1.78 mi. bituminous on native stone surfacing, and extension of old bridge, Luzerne Co. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

Pennsylvania—Dpt. Hys., Harrisburg, 2.26 mi. rein.-con. paving, through plate girder bridge, R-57, Sect. 3, Clearfield Co., to B. B. Constr. Co., Phillipsburg, $252,706; bituminous on native stone or modified crushed aggregate paving, 2 rein.-con. structure, Route 490 46, Northumberland Co., to Donaghmore Coal & Stone Co., 1218 Chestnut St., Lebanon, $40,914. Bids Dec. 6. Noted Dec. 13, C. D. — Dec. 19, E. N.-R.

Pennsylvania—Dpt. Hys., Harrisburg, 2.47 mi. rein.-con. paving, 3 rein.-con. structures, grading approaches, R-7, Sect. 3, Honesdale Boro and Texas Twp., Wayne Co., to Collins & Maxwell, Inc., Easton, $159,054. Bids Dec. 20. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

Pennsylvania — Dpt. Hys., Harrisburg, rein.-con. paving 2.53 mi., rein.-con. arch, bituminous surfacing on existing base, R-806, Sect. 1, and Route 02060, Allegheny Co., to General Asphalt Co., 307 Kahler Bldg., Canton, O., $319,626. Bids Dec. 27. Noted Jan. 13, C. D.—Jan. 23, E. N.-R.

Pennsylvania—Dpt. Hys., Harrisburg, 0.14 mi. bituminous on native stone surfacing, rein.-con. bridge, Route 07032, Snyder Twp., Blair Co., to W. M. Quigley Constr. Co., Mifflin, $12,492***1.14 mi. construction gard fence within distance of 16.61 mi., Route 247, Fayette Co., to H. E. Ramsey, Jr., 916 Bessemer Bldg., Pittsburgh, $2,963***1.04 mi. bituminous on reconstructed and crushed stone surfacing, 2 rein.-con. structures, Route 26, Sect. 1, Union Co., to Suburban Constr. Co., Devon, $34,977. Grand total $56,432. Bids Jan. 10. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

Pa., Indiana—City, grading, concrete curbing, guttering 2 mi. borough streets, day labor under supervision Borough Eng. Dpt. $55,000. W.P.A. project approved.

Pa., Lock Haven—City, improving 9.344 mi. roads in Highland Cemetery, $20,694; relocating McElhattan Run for 3 mi. above city, straightening and cleaning 2 mi. bank along Susquehanna River, $5,001; constructing emergency light station for Fire Dpt., $9,224, day labor. Grand total $34,919. **W.P.A.** projects approved. R. Scott Kift, city engr.

Pa., Nanticoke—City, opening and bituminous materials paving Kosciuzko St. from Washington St. to Middle Rd., also 260 ft. retaining wall, 5 ft. high, concrete bridge over Black Creek, cobble gutters in Pine and Bliss Sts., day labor under supervision of City Engineer's Dpt. Est. $42,549. **W.P.A.** Maturity at once.

★ **Texas**—G. Gilchrist, state hy. engr., Austin, grading, drainage structures, 8.8 mi. State Hy. 16, W.P.S.S. 802-B, Knox Co., to Wm. Henning Co., Abilene, $60,585, est. $70,000***5.818 mi. State Hy. 105, Montgomery Co., to J. P. Foty, 3009 North Henderson St., Dallas, $104,664 est. $100,000***4.179 mi. State Hy. 16, Wilson Co., to Heldenfels Bros., Rockport, $62,514 est. $70,000***5.29 mi. State Hy. 81, San Saba Co., to T. E. Sanderford, Belton, $37,410 est. $40,000***10.567 mi. State Hy. 146, Harris Co. and grading, drainage structures, shell base course paving 4.981 mi. State Hy. 146, Harris Co., to Brown & Root, Inc., 706 Colorado St., Austin, $78,807 and $76,970 respectively, est. $80,000 each***widening, grading, drainage structures 2.581 mi. State Hy. 5, W.P.H. 57, Wilbarger Co., to Combs & Glide, Wichita Falls, $28,655 est., $20,000***grading, drainage structures, triple asphalt on caliche surface treating 2.45 mi. State Hy. 7, W.P.H. 194, Part 3, Coleman Co., to Austin Bridge Co., 1813 Clarence St., Dallas, $52,151 est. $50,000***widening, drainage structures, double asphalt on caliche paving 3.181 mi. State Hy. 9, Tom Green Co., to E. F. Bucy & C. T. Childs, Ross Star, $34,663 est. $40,000***grading, drainage structures, selected material shoulders 7.746 mi. State Hy. 33, El Paso Co., to Hannah & Hall, Waco, $45,243 est. $40,000. Grand total $581,662. **New P.W.A.** Bids Dec. 20. Noted Jan. 6, C. D.

Tex., Dallas—Park Bd., grading, paving Centennial grounds at Fair Park, to Central Lithic Co., West Commerce St., and Uvalde Constr. Co., Santa Fe Bldg., $233,029. Bids Feb. 3.

Tex., Houston—Harris Co., grading, drainage structures and single bituminous surface treating 2.47 mi. Crosbyton-Huffman Rd., P.W.P. 1041-15 A and B, and grading, surfacing, drainage structures 2.317 mi. Atascosita Rd., P.W.P. 1041-46, to Brown & Root, Inc., 4300 Calhoun St., $119,493 and $16,806 respectively. Bids Jan. 17 and 29 respectively***5.958 mi. Little York School Rd., P.W.C. 1041-34, to Haden & Austin, 1st Natl. Bank Bldg., $46,896. Grand total $183,195. Bids Jan. 17. All awards subject to P.W.A. approval.

Wash., Waterville—Douglas Co., grading, gravel surfacing S.R.P. 18, Schedule A, to Goodfellow Bros., Wenatchee, $16,444. Est. $25,000. F. Thomas, Waterville, engr. Bids Jan. 27.

Wisconsin—State Hy. Comn., Madison, graveling 1.202 mi. road in Calumet Co., to J. C. Basten, 1857 Willow St., Green Bay, $20,594***3.366 mi. road in Manitowoc Co., to J. F. Schultz, Albany, $35,098***1.485 mi. Ashland Co., to Nelson, Mullen & Nelson, Inc., 355 Gateway Bldg., Minneapolis, Minn., $23,491***grading, draining, graveling 0.634 mi. Eau Claire Co., to I. S. Ofstie, 1411 Main St., Menomonie, $30,199***3.448 mi. Langlade Co., to C. and J. Theiler, Tomahawk, $18,896. Grand total $128,277. Bids Jan. 17. Noted Jan. 22, C. D.

Wisconsin—State Hy. Comn., Madison, grading, draining, graveling 0.991 mi. Winnebago Co., to Lampert & Lampert, Inc., 1055 Bowen St., Oshkosh, $20,823; graveling 7.181 mi. road in Marinette Co., to Clarence Berg, Campbellsport, $18,866. Bids Jan. 17 and Feb. 4. Noted Jan. 22 and Feb. 7, C. D.—Jan. 23, E. N.-R.

★ **Wisconsin** — State Hy. Comn., Madison, graveling or crushed stone surfacing 4.402 mi. Buffalo Co., to O. Sanders, Mount Horeb, $18,309***7.181 mi. Marinette Co., to R. E. Vickery & Co., Suamico, $65,665***0.509 mi. Marathon Co., to Wausau Constr. Co., 706 5th Ave., Wausau, $21,381***4.401 mi. Buffalo Co., to L. G. Arnold, Inc., Eau Claire, $66,885***1.714 mi. Trempealeau Co., to H. T. Smith, Hixton, $16,140***2.685 mi. Sawyer Co., to C. H. Peterson & Co., 5749 Pillsbury Ave., Minneapolis, Minn., $27,243***1.695 mi. Sheboygan Co., to Morris Martin Co., Berlin, $8,442***7.611 mi. Racine Co., to J. R. Griffin Co., 1500 9th St., Racine, $235,700***grading, graveling 1.577 mi. Portage Co., to A. J. Page, Almond, $19,004. Grand total $557,772. Bids Feb. 4. Noted Jan. 17, 21 and 27, C. D.—Jan. 23 and 30, E. N.-R.

★ **Wyoming** — State Hy. Dpt., Cheyenne, to Northwestern Eng. Co., Rapid City, S. D., grading, draining, bridges and culverts on 12.8 mi. road in Fremont, Carbon and Natrona Counties, $169,164; 1.88 mi. Natrona Co., $100,382; 19.999 mi. Lincoln Co., $59,926; 6.212 mi. Big Horn Co., $59,929; 12.488 mi.

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†*Federal Government*

...treets and Roads (Continued)

...oshen Co., $9,905***to Swenson Lumber Co., ...aramie, bridges in Fremont Co., $146,006*** ... J. H. Woodman, Cheyenne, grading, drain... bridges, culverts in Carbon Co., $121,090 ***to C. M. Smith, Thermopolis, bridges in Big Horn Co., $42,835. Grand total $699,515. Bids Feb. 4, awarded Feb. 4. Noted Jan. 28, ... D.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

†Arizona and California — Bureau Reclamation, Yuma, Ariz., takes bids in about 10 days constructing earthwork, tunnels, gravity main canal, incl. 3,398,000 cu.yd. excav., 95,000 cu. yd. drainage excav. and dikes, 93,300 cu.yd. excav. in tunnel, 580 cu.yd. concrete portal, etc., 19,550 cu.yd. concrete in tunnel and 32 tons reinforcing steel for Gila Valley Project. $300,000. R. B. Williams, Yuma, engr.

★ **†Texas**—U. S. Eng., Galveston, plans constructing dam across Brazos River at Palo Pinto, for irrigation and power project. $3,000,000. Preliminary work by W.P.A. forces.

★ **Tex., Corpus Christi**—P.W.A. Legal and Financial Divisions have approved application for $2,000,000 grant for bay front beautification, etc., improvements at west front included, sea wall for storm wave protection concrete promenade, etc., for Corpus Christi Impvt. Dist., $3,000,000.

★ **Washington**—Inter-County River Comn., 705 South 11th St., Tacoma, seeks construction Mud Mountain impounding dam 80 ft. wide at narrowest point, 150 ft. wide at top and 400 ft. high, six miles east of Buckley for flood control. $3,000,000. B. P. Thomas, 2914 North 24th St., Tacoma, engr.

BIDS ASKED

†Arizona and California—Feb. 27, by Bureau Reclamation, Yuma, Ariz., constructing earthwork and tunnels for Station 30 to Station 931, Gravity Main Canal, Gila Valley Project, incl. 3,443,000 cu.yd. canal excav., 120,000 cu.yd. excav. for drainage channels and dikes; 92,500 cu.yd. excav. in tunnels. Noted Feb. 13, C. D.

★ **†Calif., San Francisco**—U. S. Eng., bids about Mar. 4, placing dredger fill and constructing rock retaining wall on 385 acre site of tide lands north of Yerba Buena Island, San Francisco Bay, incl. 16,000,000 cu.yd. sand fill and 200,000 tons rock retaining wall. $3,043,120 P.W.A. allotment. Noted Jan. 31, C. D.—Feb. 6, E. N.-R.

Conn., Bridgeport—See "Contracts Awarded."

†Louisiana—Feb. 27, by U. S. Eng., New Orleans, constructing 500,000 cu.yd. earthwork in Slocum Levee on Red River.

La., Shreveport—Mar. 10, by Bd. Comn. Caddo Levee Dist., constructing 300 lin. ft. permeable three row pile timber training spur in Cairo Bend on the Red River.

Utah, Randolph—See "Contracts Awarded."

LOW BIDDERS

★ **†Mass., Boston**—U. S. Eng., Custom House, dredging 795,658 cu.yd. Sect. A in Boston Harbor, 1,206,755 cu.yd. Sect. B and 439,176 cu.yd. Sect. C, from Morris & Cummings Dredging Co., 15 Moore St., New York, $1,240,645 ***Sect. A, only from M. A. Breyman Dredging Co., 17 Battery Pl., New York, N. Y., $473,447.

CONTRACTS AWARDED

Conn., Bridgeport — Town, W. Shea, mgr., Town Hall, 800 ft. seawall and jetty, Short Beach, $10,153; concrete retaining wall and concrete hoppers in Town Yard, $19,935, W.P.A. labor. W. Dunbar, Town Hall, engr.

Ia., Fort Dodge—Webster Co., 48,000 cu.yd. drainage excav. in Lateral 2, 21,000 cu.yd. Lateral 4, 23,000 cu.yd. Lateral 5, and 10,200 cu.yd. in District 5, to A. R. Eno, Fort Dodge, 7.6c. per cu. yd. Bids Feb. 3. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

Ky., Paducah—See "Unclassified."

†Minn., St. Paul—U. S. Eng., constructing channel markers in pools of Dams 5a and 6, in Mississippi River, to W. W. Magee Co., 118 West Central Ave., $34,361. Bids Jan. 28. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

†Montana — Bureau Reclamation, Missoula, constructing diversion works and 89,339 ft. section main canal Frenchtown Federal Reclamation Project, incl. 20 ft. high diversion dam over Missoula River, to Bates & Hale, Missoula, $48,330. Bids Jan. 2. Noted Jan. 14, C. D.

†Pennsylvania and Delaware — U. S. Eng., Phila., Pa., placing rip rap stone on Edgemoor Dike, to Dravo Contg. Co., Neville Island, Pittsburgh, Pa., $173,550; dredging 58,000 cu.yd. from Smyrna River, Delaware, to Steen Dredging Corp., Dagsboro, Del., $14,500. Bids Dec. 20 and Jan. 7.

†Tennessee — Tennessee Valley Authority, Knoxville, drilling and testing at Chickamauga Dam, Req. 82112, to Sprague & Henwood, Scranton, Pa., $20,920. Bids Jan. 21. Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

†Federal Government.

†Texas—See "Proposed Work."

Utah, Randolph—Rich Co., constructing 1,250 ft. earth dam, 47 ft. high on Big Creek, day labor, $69,000, $29,000 worth of material and non-relief labor, and balance W.P.A.. J. A. Bowers, Ogden, dist. P.W.A. engr.

B. C., Fraser River—Dpt. P. Wks., Ottawa, Ont., dredging 535,300 cu.yd. sand and silt, in North Arm, to British Columbia Bridge & Dredging Co. Ltd., Vancouver, at 13.75c. per ft., total $73,603. Est. $200,000.

UNCLASSIFIED

PROPOSED WORK

★ **†Calif., Alameda**—FLEET AIR BASE—City voted to transfer 929 acres of municipal tidelands to Navy Dpt. for developing fleet air base, contingent upon early expenditure, incl. channel, dredging and docks for aircraft carriers, on site adjoining Benton Field. To exceed $1,000,000.

Calif., Los Angeles—SUBWAY—Bd. P. Wks., indefinitely postponed bids to have been opened Feb. 5, pending P.W.A. approval of plans for construction of Macy St. subway, rein.-con., 2 hinge arch type, 68 ft. wide, 505 ft. long, 17 ft. clearance, 18,870 cu.yd. earth excav., 10,174 cu.yd. rein.-con., 1,280 tons reinforcing steel, etc. $368,000. L. Aldrich, City Hall, engr. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

Calif., San Francisco—ELECTRICAL DISTRIBUTING SYSTEM, etc.—See "Bridges and Grade Crossings."

Ga., Savannah — AIRPORT — Municipality plans aircraft hangar. $63,000. A. S. Goebel, c/o Municipality, engr.

Ill., Springfield — CAMP — City plans girls' camp at Lake Springfield. $60,000. W.P.A. project.

Mich., Detroit—LIGHTING EXTENSIONS—Public Lighting Comn. plans lighting extensions and improvements, consisting of replacing present lighting equipment with general increase in power on 9 main streets. $145,000. Appropriation made. J. S. Worley, 138 East Atwater St., consult. engr.

Mo., St. Louis — RADIO TRANSMISSION STATION—Thomas Patrick, Inc., Chase Hotel, soon takes bids 1 story, 54x61 ft., brick L-shaped station building, hot air heating, roofing, insulation, studios, control room, engineers' lounge, television, transmission tower, east of Bway. and south of Riverview Dr. $25,000. LaBeaume & Klein, 315 North 7th St., archts.

★ **Mo., St. Louis** — RAILROAD — Missouri Pacific R.R., S. L. Wonson, asst. ch. engr., Missouri Pacific Bldg., authorized by Judge J. H. Moore to expend $6,422,894 for roadbed and equipment during 1936, incl. $5,236,868 for track work, roadbed, bridges, shop equipment, locomotives and freight and passenger cars on main line, and balance will be expended on subsidiaries improvements for tracks and roadbed will cost about $3,860,000.

N. C., Rocky Mount—STADIUM, etc.—City voted bonds for stadium and gymnasium. $60,000. L. B. Aycock, city mgr.

★ **Pa., Pittsburgh**—FREE PORT DEVELOPMENT—Free Trade Port, c/o Mayor, City Hall, plans piers, docks, storage, processing and barriers for free port development. To exceed $1,000,000.

★ **Texas** — RAILROAD IMPROVEMENTS — Southern Pacific Railway Co., R. W. Barnes, en. engr., lines in Texas and Louisiana, Houston, plans flood and safety project, incl. 14 mi. new main track and 180,000 cu.yd. earth embankment at one location and 80,000 cu.yd. on other section, in Thurston and Sanderson Sections. $600,000. A second bridge will be built near Thurston to replace one recently washed out, will be 150 ft. steel span, 75 ft. girder in center and 75 ft. approaches.

Tex., Sherman—AIRPORT—City soon takes bids airport, incl. runways, hangar, night lighting system, drainage, etc., small repair shop, $40,000. Dpt. Commerce has just approved project for amount of $27,044. U. S. Government Airway Eng. Branch, Wash., D. C., engrs.

Ontario — RAILROAD — General Refractory Products & Paper Co. Ltd., Toronto, bids early in spring constructing spur, 7 mi. from logging railway situated between Kapuskasing and Smoky Falls, operated by Spruce Falls River and Paper Co. Ltd.

Ont., Cornwall—ICE ARENA—General Com., B. D. Millidge and A. Horovitz, M. S. Dunn, chn., soon takes bids constructing artificial ice arena. Est. about $55,000. Architect not appointed. Noted Feb. 13, C. D.

BIDS ASKED

Ala., Stapleton—RURAL ELECTRIFICATION—See "Contracts Awarded."

Conn., Hartford—AIRPORT ENLARGEMENT—See "Contracts Awarded."

Ind., Whiting—PIPE LINE—See "Contracts Awarded."

Ky., Paducah—PARK DEVELOPMENT—See "Contracts Awarded."

Mass., Mattapan (sta. Boston)—LAND DEVELOPMENT—See "Contracts Awarded."

†Minn., Hastings—ELECTRICAL WORK—See "Contracts Awarded."

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Information Department,
ENGINEERING NEWS-RECORD
330 West 42d Street, New York, N. Y.

Unclassified (Continued)

Va., Jewell Ridge—COAL TIPPLE—Jewell Ridge Coal Tipple, Bluefield, taking bids structural housing, coal prepartion and handling equipment for coal tipple. $200,000. Allen & Garcia Co., 332 North Michigan Ave., Chicago, Ill., engrs.

CONTRACTS AWARDED

Ala., Stapleton—RURAL ELECTRIFICATION—Baldwin County Power Co., 53 mi. rural electrification, vicinity of here, day labor and separate contracts. To exceed $50,000.

California — TELESCOPE MECHANICAL PARTS—Observatory Council of California Institute of Technology, Pasadena, constructing of mechanical parts of 200 in. astronomical telescope, to be erected on Palomar Mountain, San Diego Co., to Westinghouse Electric & Mfg. Co., 420 South San Pedro St., Los Angeles. The telescope tube is to be 55 ft. long, 24 ft. diam. at base, and weighing 850 tons.

†**Calif., San Diego**—PILE DRIVING—Yards & Docks, Navy Dpt., Wash., D. C., driving foundation piles at Naval Operating Base (Marine Corps Base), to C. and F. W. Steffgen, 2015 Bay Front St., $1,494.

Conn., Hartford—AIRPORT ENLARGEMENT—City, Hartford Aviation Com., Municipal Bldg., 3 story, basement, 47x60 ft., and two 25x30 ft. wings, administration building, two runways, each 200 ft. wide, 3,000 ft. long, bituminous macadam paving same, grading 150 acres, Brainerd Field, etc., W.P.A. labor. $318,458. Est. $320,000. $304,000 Federal funds ready. Noted June 19, C. D.—June 27, E. N.-R.

Ill., Chicago—PIER—City, furnishing, installing 60 gas heating units for east 2,260 ft. space known as the North Passenger Building of Navy Pier, foot of Grand Ave., to Robert Gordon, Inc., 22 West Austin Ave., $56,480. Bids Jan. 30, awarded Feb. 5. Noted Feb. 4, C. D.

Ind., Whiting—PIPE LINE—Stanolind Pipe Line Co., Whiting, increasing capacity of pipe line through construction 86 mi. 12 in. pipe line, separate contracts. To exceed $100,000.

★**Kansas**—NATURAL GAS MAINS—Northern Natural Gas Co., Omaha, Neb., supplying 20 in. electrically welded pipe for 100 mi. feed line between Hugoton Kansas gas fields to Mullinville, to be delivered along in April, May and June, to A. O. Smith Corp., 3533 North 27th St., Milwaukee, Wis., $1,000,000.

Ky., Paducah—PARK DEVELOPMENT—City, filling swamp, largely by dredging from Ohio River and area of about 13 acres will be built up and landscaped as a park with driveway along the river front, relief labor. Est. $220,000. **W.P.A.** Work started.

Massachusetts — TRANSMISSION LINE — Eastern Mass. Street Railway Co., 27 Torrey St., Brockton, and 38 Chauncy St., Boston, clearing 19.47 mi. high tension transmission line right-of-way of brush, undergrowth, timber, etc., 50 ft. wide throughout Brockton, Taunton, West Bridgewater, Bridgewater, Raynham, Berkeley and Freetown, to New England Tree Expert Co., Inc., 80 Boyston St., Boston. Bids Feb. 3, awarded Feb. 10. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

★**Mass., Mattapan** (sta. Boston)—LAND DEVELOPMENT — Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, developing 224 acres surrounding present hospital building, incl. cutting brush, filling, grading, drainage, stone walls, roads and parking spaces to be used for outdoor life of patients, day labor under **W.P.A.**, labor $651,050, materials and equipment $27,991. Labor funds allotted by Government, material and equipment funds allotted by State.

†**Minn., Hastings**—ELECTRICAL WORK—U. S. Eng., St. Paul, constructing electrical work at Hastings Lock, Mississippi River, by Government plant and hired labor. Bids Jan. 14 rejected. Noted Jan. 10, C. D.

†**Nev., Boulder City**—VENTILATING DUCT SYSTEMS, etc.—Bureau Reclamation, Denver, Colo., furnishing 2 ventilating duct systems and 2 motor driven exhaust fans for Arizona and Nevada tunnel plug outlets and 4 ventilating duct systems and 4 motor driven exhaust fans for upper and lower penstock tunnels, at Boulder Dam, to Electric Ventilating & Eng. Co., 30 Church St., New York, N. Y., $22,750. Bids Jan. 2.

†**N. Y., Brooklyn**—SWITCHGEAR—Yards & Docks, Navy Dpt., Wash., D. C., switchgear for control of Feeder P3, at Navy Yard, to Harry Alexander, Inc., 330 5th Ave., New York, $5,380.

N. Y., New York—RAILROADS—See "Materials and Equipment."

N. C., Greensboro—TRAFFIC CONTROL SIGNAL SYSTEM—City, A. Joyner, mgr., constructing traffic control signal system, to Starr Electric Co., Greensboro, $8,200. Noted Jan. 28, C. D.

MATERIALS AND EQUIPMENT

PROPOSED WORK

ROAD EQUIPMENT—**Colorado Springs, Colo.**—Comrs. El Paso Co., C. N. Wheeler, road comr., plans purchasing motor grader, pneumatic tires to augment road oiling equipment.

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STEEL TANKS — **St. Louis, Mo.** — M... Realty Co., Halls Ferry Rd. and McLaran A... granted permit to install three 1,000 gal. un... ground steel tanks, for gasoline for automo... service station, Halls Ferry Rd. and McL... Ave.

FIRE PUMPER—**East Rockaway, N. Y.** — East Rockaway Village Bd. voted to su... proposition for purchase of 1,000 gal. motor... fire pumper. $15,000.

PIPE METERS, etc.—**Canton, O.**—City p... purchasing c.i. pipe and fittings, $7,418; ... water meters, $5,000; meter parts, $3,5... repair water lines and hydrants, $7,500; ... plans flood relief in Forest Ave. and o... streets, $11,521. M. Bauhof, dir. Water D... City Hall, engr.

SEWER PIPE — **Johnstown, Pa.** — City ... early in March, furnishing materials and eq... ment for $17,000 W.P.A. sewage project, ... 40 manholes and 6 in. sewer pipe. Est. ... of material $3,200. H. Lee Wilson, city e...

SEWER PIPE—**Lock Haven, Pa.**—City, G... Stevenson, mayor, takes bids before Mar... furnishing 1,716 lin.ft. 36 in. sewer pipe. ... Scott Kift, city hall, city engr.

SNOW REMOVAL EQUIPMENT—**Milwaukee, Wis.**—City soon purchases snow removing equipment. $50,000. R. E. Stoelting, city comr.

FIRE FIGHTING EQUIPMENT—**Gloucester, Ont.**—C. Guest, twp. reeve, soon takes bids ... fighting equipment. $3,000-$5,000.

AIR COMPRESSOR, etc.—**Ottawa, Ont.**—S... retary Bd. Control soon takes bids 1 air c... pressor, air drills, 1 gasoline tandem roller, ... tool heater and pavement breakers. $14,300. F. C. Askwith, Ottawa, engr.

TRUCKS—**Ottawa, Ont.**—Secretary Bd. Control soon takes bids truck equipped with units for pavement flushing, snow plow, etc., $14,500; also truck equipped for both snow plow and dump purposes, $8,500. F. C. Askwith, Ottawa, engr.

SNOW MACHINES — **Montreal, Que.** — City Executive Com. soon takes bids 3 snow blowing or snow inhaling machines.

BIDS ASKED

BATCH CAR BODIES—**Los Angeles, Calif.**—Feb. 28, by Metropolitan Water Dist., 306 West 3rd St., 40 steel batch car bodies for use in concrete work, Colorado River Aqueduct, Spec. 147. To exceed $5,000.

TANKS, etc.—**Los Angeles, Calif.**—See "Industrial Buildings," under "Proposed Work."

TRUCKS, etc. — **New Haven, Conn.** — State, W.P.A. headquarters, W. P. Daly, state administrator, taking bids for hire of 30 trucks and tractors for use Hartford airport project.

FENCING MATERIAL, etc.—**Wash., D. C.**—Feb. 27, by General Purchasing Officer Panama Canal, fencing material, warehouse trucks, copper covered steel wire, bare copper wire, track bolts, track spikes, fire clay bricks, refractories, copper tin, pig iron, ferrosilicon, calcium carbide, silica sand, ganister, coke, corkboard, asbestos, pipe covering, roofing felt, asphalt, lumber.

TRUCKS, etc.—**Evansville, Ind.**—Feb. 28, by Bd. P. Wks., G. H. Bosse, chn., City Hall, four 1½ ton trucks with pick-up type bodies; two 1½ ton hydraulic dump trucks; one 2 ton hydraulic dump truck; one 1½ ton express truck, steel body; one 1½ ton truck all steel body; one 1½ ton truck with overload springs, 2 way winch, single niggerhead; one ½ ton commercial canopy truck with screen sides body.

LUMBER, etc.—**Sioux City, Ia.**—Feb. 28, by Woodbury Co., W. H. Thompson, aud., 12 cars Douglas fir bridge lumber; 3 cars treated Douglas fir bridge lumber; 1 car treated yellow pine rough lumber; 9 cars treated yellow pine piling; and 3 cars red cedar. J. C. McLwean, co. engr.

†LUMBER—**Vicksburg, Miss.**—Feb. 27, by U. S. Eng., Box 667, 500,000 ft. BM mattress lumber.

†PUMPING UNIT—**Vicksburg, Miss.**—Mar. 3, by U. S. Eng., Box 665, new and unused centrifugal pumping unit, 7,250 g.p.m. with direct connected electrically driven motor, f.o.b. cars Vicksburg.

†TRUCK — **Vicksburg, Miss.** — Feb. 28, by U. S. Eng., P. O. Box 667, Vicksburg, truck, f.o.b. Vicksburg.

†WIRE ROPE CLIPS, etc.—**Vicksburg, Miss.**—Mar. 9, by U. S. Eng., Box 667, 1,500 heavy duty wire rope clips, 144 black forged steel welders, turnbuckles with stub end, f.o.b. Vicksburg.

†WIRE STRAND—**Vicksburg, Miss.**—Feb. 26, by U. S. Eng., Box 667, Vicksburg, furnishing, delivering 30,000 lb. ¼ in. diam. 7 wire soft annealed steel strand, f.o.b. Greenville.

†YELLOW PINE — **Vicksburg, Miss.** — Mar. 16, by U. S. Eng., P. O. Box 667, 20,400 ft. B.M. dense long leaf yellow pine, f.o.b. Greenville.

ROAD OIL, etc.—**Clayton, Mo.**—Feb. 26, by St. Louis Co. Court, c/o W. E. Miller, clk., Court House, furnishing 750,000 gal. more or less road oil for use on county roads to be ordered as needed between May 2, 1936 and Mar. 31, 1937; also 30,000 gal. of asphalt for roads between April 2, 1936 and Mar. 31, 1937. I. M. Crutsinger, Clayton, co. engr.

†MATTRESS LUMBER—**Kansas City, Mo.**—Feb. 28, by U. S. Eng., 200,000 bd. ft. mattress lumber, delivered to South Point. $6,000.

†*Federal Government.*

Materials, etc. (Continued)

†**WOODEN PILES—Kansas City, Mo.**—Mar. 3, by U. S. Eng., 232 Mfg. Exch. Bldg., 93,000 lin.ft. wooden piles from 26-66 ft. in length, 93,000.

DIATHERMATIC OVENS — Omaha, Neb. — Ben-Barmetteler Biscuit Co., 30th and Taylor Sts., O. H. Barmetteler, pres., in market for automatic diathermatic ovens, material elevators, mixing and fermenting equipment, automatic machinery, thermastatical control equipment, automatic cooling conveyors, icing equipment, air conditioning. Est. about $200,000.

TRUCK PUMPER—Falconer, N. Y.—Feb. 25, by Bd. Village Trustees, Community Bldg., one 500 gal. double stage centrifugal type fire truck pumper, with one 200 gal. booster tank and divided hose body; and alternate one 600 gal. double stage centrifugal type fire truck pumper. To exceed $1,000. S. T. Benson, village engr.

AIR COMPRESSOR, etc.—Jamestown, N. Y.—Sterling Oil Co., Emlenton, Pa., in market for air compressor, electric pump, battery charging equipment, hydraulic lifts and other equipment for installation in superservice station, 504 West 3rd St.

LIGHT POLES—Niagara Falls, N. Y.—City, W. D. Robbins, mgr., City Hall, taking bids 18 ornamental light poles, complete with lamps and canopies. $1,000. H. W. Clark, city engr.

TRACTOR—Beach, N. D.—Mar. 3, by M. E. Smith, aud., Golden Valley Co. 1 tractor, crawler type, diesel powered of not less than 60 hp.

CULVERT PIPE—Hillsboro, N. D.—Mar. 4, by G. D. Olson, aud., Traill Co. furnishing year's supply metal and concrete culvert pipe.

DELIVERY TRUCK—Cincinnati, O.—Feb. 26, by H. F. Wagner, city purch. agt., one panel body delivery truck for Bd. Park Comrs.

TRACTOR — Forest City, Pa. — Peter Lasco taking bids for caterpillar tractor. To exceed $1,000.

TRACTOR and TRAILER—Indiana, Pa.—H. A. Orr taking bids new tractor and trailer for use in excavating business. $3,000.

AUTOMATIC CHLORINE MACHINES — Oil City, Pa.—Mar. 2, by C. E. Hetrick, city clk., 2 automatic chlorine machines to purify city's water supply, to replace antiquated units now in use. $4,000. B. B. Webber, city engr.

TRUCK CHASSIS—Spokane, Wash.—Feb. 27, by C. T. Bogart, city purch. agt., model truck chassis with pay load capacity of not less than 12,000 lb.

PUMP—Niagara Falls, Ont.—W. S. Orr, city engr., Queen St., in market for 4 in. suction and discharge pump with discharge of 25 to 30 ft.

CONTRACTS AWARDED

CRUSHED ROCK, etc.—Los Angeles, Calif.—A. J. Holm, city purch. agt., City Hall, furnishing Nos. 2 and 3 and 4, crushed rock and washed concrete sand for period ending June 30, Spec. 3461 and furnishing crushed rock and sand, Spec. 3459, to Consolidated Rock Products Co., 2730 South Alameda St., Vernon, $4,400 and $42,500 respectively. Bids Jan. 24, awarded Feb. 3; furnishing stone dust as required for period ending June 30, Spec. 3462, to California Portland Cement Co., 523 West 6th St., $3,000. Bids Jan. 24, awarded Feb. 4. Grand total $52,900. Noted Jan. 21.

SYNCHRONOUS CONDENSERS—Los Angeles, Calif. — D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway; hauling, loading and placing on foundations 2 synchronous condensers, rotors and stators, at 9615 Central Ave., Spec. 1857, to Smith Bros. Trucking Co., 1704 East 16th St., $7,210. Bids Jan. 23 awarded Feb. 4. Noted Jan. 30, C. D

WHITE-WASH MATERIALS — Los Angeles, Calif.—Directors Metropolitan Water Dist., 306 West 3rd St., 500,000 lb. whitewash materials, Spec. 142, to Chubbuck Lime Co., 5000 Worth St. $6,500. Bids Jan. 20. Noted Jan. 30 C. D.

CAST IRON PIPE—Pueblo, Colo.—Bd. Trustees Pueblo Water Works, D. P. Porter, supt., furnishing 1,600 lin.ft. 6 in. c.i. water pipe, to Colorado Fuel & Iron Co., Continental Oil Bldg., Denver, 74.5c. per ft. Pipe to be used by owner, in extending Fairmount Park, with day labor.

MANHOLE and CATCH BASIN COVERS, etc. Chicago, Ill. — City, City Hall, manhole and catch basin covers, inlet boxes, inlet grates, gutter box bends, for Bureau Engineering, to C. H. Hopple Fdry. Co., 373 West Grand Ave., $13,388. Bids Jan. 30, awarded Feb. 7.

TRACK TYPE TRACTOR—Galesburg, Ill.—City, furnishing track type tractor to Street Dpt., to M. F. Miley, Macomb, $7,800. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

GAS MAKING EQUIPMENT—Cedar Falls, Ia.—City Council, gas holder, water gas machines, motor driven blowers, etc., to Semet-Solvay Eng. Corp., 40 Rector St., New York, N. Y., $33,845. Est. $35,000. Bids Feb. 3, awarded Feb. 3. Noted Jan. 27, C. D.

LUMBER—Decorah, Ia—Winneshiek Co., S. Handley, aud. to Nebraska Bridge, Lumber & Supply Co., 740 Union State Bank Bldg., Omaha, Neb., 75,000 ft. untreated fir lumber at $39.75 per 1,000; 18,998 ft. treated fir lumber $78.50 per 1,000; 2,024 ft. treated pine piling 49c. ft. ***to Ziedler Concrete Products Co., Muscatine, 3,000 lin. ft. 15 in. concrete culvert pipe 74c. per ft. 3,000 lin. ft. 18 in. at 88c., 500 ft. 12 in. $1.26, 500 lin. ft. 24 in. $1.51, 30 lin. ft. 36 in. $3.35, total $6,345. Bids Feb. 5, awarded Feb. 5. Noted Jan. 20, C. D.—Jan. 23, E. N.-R. 23, E. N.-R.

LUMBER—Iowa City, Ia.—Johnson Co., 156,600 ft. BM untreated and 84,450 ft. BM treated lumber and 3,560 lin.ft. treated piling, to Wheeler Lumber Bridge & Supply Co., 606 Hubbell Bldg., Des Moines, $15,918. Bids Feb. 5, awarded Feb. 5. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

PIPE—Orange City, Ia.—Sioux Co., 8,068 lin.ft. 18- to 42-in. corrugated metal rein.-con. culvert pipe, to Hawarden Cement Block & Tile Co., Hawarden, $2,888***6,980 lin.ft. 18- to 42-in. corrugated metal pipe, to Barton-Warner Co., Sioux City, $10,749. Bids Feb. 4. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

ROAD GRADERS, etc.—Vinton, Ia.—Benton Co., 2 heavy road graders, 1 push maintainer and 3 fresnos, to J. D. Adams, Davenport, $8,340***1 push maintainer, to Waterloo Constr. Co., Waterloo, $2,719***3 tractors and 1 push maintainer, to Matin Ronsa Tractor Co., Cedar Rapids, $14,104***5 pull maintainers, to Royer Mfg. Co., Janesville, $4,375. Grand total $29,538. Bids Jan. 30, awarded Jan. 30. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

†**GENERATING SETS, etc.—Eastport, Me.**—U. S. Eng., Eastport, 2 Diesel engine driven generating sets for Passamaquoddy Bay Dam and Power Plant Project, to Winston Eng. Corp., 2160 West 106th St., Cleveland, O., Item (1) $54,361 (2) $42,466***one 90 hp. Diesel tractor with bulldozer, to Eastern Tractor & Equipment Co., Portland, Me., $8,932***2 crawler type excavators, to Osgood Co., Marion, O., $30,239***220 pcs. spruce piling, to W. B. Bailey, Machias, Me., $4,560. Grand total $140,558. Bids Dec. 24, Jan. 17 and 20. Noted Jan. 13 and 15, C. D.—Jan. 16, E. N.-R.

†**STORAGE TANK, etc.—Eastport, Me.**—U. S. Eng., 15,000 gal. steel fuel oil storage tank, to Gould Equipment Co., Box 1611, Portland, $924 ***4 portable air compressors, to Bicknell Mfg. Co., Rockland, $4,275***globe and gate valves, to Reading Pratt & Cady Co., Inc., South Boston, $1,134***common hard clay brick, to T. F. Mabee Lumber Co., Eastport, at $20.71 per 1,000. Bids Jan. 13 and 17. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

DISC WATER METERS—Baltimore, Md.—Bd. Awards, furnishing, delivering disc water meters to Bureau Water Supply, to Worthington-Gamon Meter Co., Harrison, N. J., $10,875. Bids Jan. 29. Noted Feb. 4, C. D.

LAMP POSTS—Baltimore, Md.—Bd. Awards, furnishing, delivering c.i. lamp posts to Bureau Mechanical Electrical Service, to Foran Fdry. Co., Flemington, N. J., $2,335. Bids Jan. 29. Noted Feb. 4, C. D.

PAVING BLOCKS — Baltimore, Md. — Bd. Awards, Municipal Bldg., furnishing, delivering paving blocks to Bureau of Hys., for year 1936, to Westport Paving Brick Co., Westport, Baltimore, $9,945. Bids Jan. 29. Noted Feb. 4, C. D.

LUMBER—Beverly, Mass.—City, Clerk of Comm., Public Service & Aid, City Hall, about 80,000 bd. ft. lumber, to J. F. Pope & Son, 82 River St., $2,598. Bids Jan. 28, awarded Feb. 4. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

PIPE—Pittsfield, Mass.—Municipality, furnishing 300 tons 4-to 20-in. c.i. pipe, to U. S. Pipe & Fdry. Co., Burlington, N. J. Est. $12,000 or more. P.W.A.

LIQUID CHLORINE, etc.—Minneapolis, Minn.—City, F. S. Gram, purch. agt., ten cars about 300,000 lb. liquid Chlorine, for Water Dpt., to Merchants Chemical Co., 110 Northeast 6th St., $2.84 per cwt.***one asphalt storage and heating tank for Engineering Dpt., to Simplicity System Co., Riverside Dr., Chattanooga, Tenn., $2,637. Bids Jan. 22. Noted Jan. 29, C. D.

MAINTENANCE MATERIALS — Jackson, Miss. — E. D. Kenna, dir. State Hy. Comm., Standard Life Bldg., Jackson, furnishing sand and gravel for 6 months' period, to B. H. Alexander, Lexington, American Sand & Gravel Co., Hattiesburg, Amory Concrete & Gravel Co., Amory, Amory Sand & Gravel Co., Amory, Brookhaven Gravel Co., Brookhaven, Columbus Gravel Co., Inc., Columbus, Fair River Sand & Gravel Co., Wanilla, Forrest County Gravel Co., Hattiesburg, Gatesville Gravel Co., Jackson, Green Bros. Gravel Co., Lexington, Greenville Sand & Gravel Co., Greenville, W. P. Hammett, Tchula, Hattiesburg Gravel Supply Co., Hattiesburg, Lynn Gravel Co., Inc., Avalon, Memphis Stone & Gravel Co., Memphis, Tenn., Richton Investment Co., Richton, Southern Sand & Gravel Co., Columbus, Schoenberg Gravel Co., Georgetown, Southern Gravel Co., Greenville, Waters & McCrary Gravel Co., Columbus*** crushed washed gravel and slag for 6 months' period, to Birmingham Slag Co., Birmingham, Ala., Woodstock Slag Co., Birmingham, Ala., American Sand & Gravel Co., Hattiesburg, Amory Sand & Gravel Co., Amory, Fair River Sand & Gravel Co., Wanilla, Forrest County Gravel Co., Hattiesburg, Hattiesburg Gravel Supply Co., Hattiesburg, Waters & McCrary Gravel Co., Columbus***road signs and markers for 12 months' period, to National Colortype Co., Bellevue, Ky., S. G. Adams Co., St. Louis, Mo., Grimm Stamp & Badge Co., St. Louis, Mo.***paints for 6 months' period, to Certainteed Products Corp., New Orleans, La.***sign posts for 6 months' period, to Sweet's Steel Co., Williamsport, Pa.***treated lumber and piling for 6 months' period, to American Creosote Works, Inc., New Orleans, La., Colonial Creosot-

†*Federal Government.*

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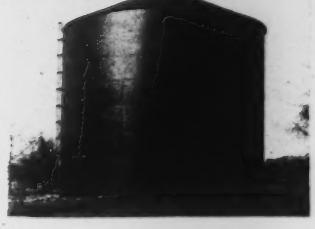
STEEL STORAGE TANKS



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Materials, etc. (Continued)

ing Co., Bogalusa, La., Crosby Lumber & Mfg. Co., Crosby, Gulfport Creosoting Co., Gulfport, Gulf States Creosoting Co., Hattiesburg, T. J. Moss Tie Co., Columbus, Republic Creosoting Co., Mobile, Ala., Wood Preserving Co., Memphis, Tenn.***bituminous materials for 6 months' period, to Lion Oil Refining Co., New Orleans, La., Shell Petroleum Corp., New Orleans, La., Standard Oil Co. of La., New Orleans, La., Pan-American Petroleum Corp. of La., New Orleans, La., Texas Co., Houston, Tex., Highway Materials Co., Jackson, Miss. ***refined tars, to Koppers Products Co., Birmingham, Ala., The Barrett Co., Birmingham, Ala., Reilly Tar & Chemical Co., Birmingham, Ala.***special bituminous materials, to The Texas Co., New Orleans, La., American Bitumuls Co., Kentucky Rock Asphalt Co., Inc., Birmingham Slag Co., Birmingham, Ala., Alabama Asphaltic Limestone Co., Birmingham, Ala., and Sam E. Finley, Birmingham, Ala. Est. $12,000. Noted Dec. 12, C. D.

†DRAG LINE—**Kansas City, Mo.**—U. S. Eng., 232 Mfg. Exch. Bldg., one 1½ yd. drag line, 60 ft. boom, 120 hp. gasoline engine with starter, lighting plant, etc., to Northwest Eng. Co., 28 East Jackson St., Chicago, Ill., $13,239. To exceed $15,000. Bids Jan. 10, awarded Feb. 4. Noted Jan. 20, C. D.

†STEEL WIRE STRAND—**Kansas City, Mo.**—U. S. Eng., 232 Mfg. Exch. Bldg., 40,000 lb. two No. 14 galvanized annealed steel wire strand, to American Steel & Wire Co., 417 Grand Ave., $1,260. Est. $1,200. Bids Jan. 29, awarded Feb. 8. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

★ RAILS, etc.—**New York, N. Y.**—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., rails and splice bars $1,918,160, track fastenings $1,182,370, to Bethlehem Steel Co., Bethlehem, Pa.***to Carnegie-Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa.***to Algoma Steel Co., 330 Bay St., Toronto, Ont. Est. about $3,100,000. Owner will place rails by day labor and separate contracts.

FILTER SAND and STEEL—**Cincinnati, O.**—City, 1,200 tons silica filter sand, to Northern Gravel Co., North Vine St., $5,520; 2,300 pcs. reinforcing steel, to Atlas Supply Co., Sherman Ave., Norwood, $759. Bids Dec. 18, awarded Feb. 7 and 4 respectively. Noted Dec. 12, C. D.

†PUMPS—**Portland, Ore.**—U. S. Eng., pumps for Bonneville Dam, Schedule 1-6, to Bingham Pump Co., 705 South Main St., $10,077*** Schedule 7, to Schutte & Koerting, Lewis Bldg., $453***Schedule 9, to Woodin & Little, $631 ***Schedule 10, to Worthington Pump Co., Lewis Bldg., $15,272***Schedule 11, to Garder-Denver Co., 333 Southwest Pine St., $1,330. Grand total $27,765. Bids Jan. 10. Noted Jan. 3, C. D.

†BOILERS—**Memphis, Tenn.**—U. S. Eng., P. O. Box 98, 2 marine-type water tube boilers for Dredge Potter, to Foster Wheeler Corp., 165 Bway., New York, N. Y., $41,250. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

†STEEL PIPE, etc.—**Galveston, Tex.**—U. S. Eng., Galveston, 588 ft. 11 in. discharge pipe and 68 flanges, to Alco Products Co., 220 East 42nd St., New York.

STEEL RAILS—**Norfolk, Va.**—Virginian R. R. Co., A. M. Traugott, ch. engr., Terminal Bldg., 4,100 tons steel rails to Bethlehem Steel Corp., Bethlehem, Pa. Est. exceeds $135,000. Will lay rails and do track work by day labor and separate contracts.

†REWINDING TRANSFORMERS — **Portsmouth, Va.**—Yards & Docks, Navy Dpt., Wash., D. C., rewinding electric power transformers, at Norfolk Navy Yard, to Central Armature Wks., Inc., 625 D St. N.W., Wash., $3,270.

DREDGE PIPE — **Aberdeen, Wash.** — Port Grays Harbor, W. J. Murphy, mgr., ft. Myrtle St., 1,500 ft. dredge pipe for dredge Washington, to Hydraulic Supply Mfg. Co., 7500 Eighth Ave. S., Seattle, $3,309. Awarded Feb. 8.

FIRE HYDRANTS—**Spokane, Wash.**—City, 17 Rensselaer Corey fire hydrants, to Hughes & Co., South 119 Howard St., $1,360***eight 6 in. Columbia hydrants, to Marshall-Wells, South 157 Howard St. $640.

CAST IRON PIPE — **Sumner, Wash.** — City, 550 ft. 6 in., 500 ft. 8 in., and 1,000 ft. 14 in. c.i. pipe to U. S. Pipe & Fdry. Co., Colman Bldg., Seattle, $2,615. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

LIGHTING GLOBES—**Tacoma, Wash.**—City, 670 street lighting globes, to C. G. Stewart, 1721 Jefferson Ave. (representing Line Material Co., 2216 1st St., Seattle), $2,215. Noted Jan. 28, C. D.

POWER SHOVEL—**Lake, Wis.**—Town, furnishing power shovel, to Koehring Co., 3026 West Concordia Ave., Milwaukee, $2,890. Bids Jan. 22, awarded Feb. 5.

†REINFORCING BARS, etc.—**Madison, Wis.**—Treas. Dpt. at Procurement Div., to O. J. Dean Steel Co., 1925 South 54th St., Chicago, Ill., 104,278 lb. reinforcing bars, delivered to North 35th and West Congress Sts., Milwaukee, $2,100***to J. B. Clow Co., 201 North Talman Ave., Chicago, Ill., 4,040 ft. 6 in. c.i. water pipe at 63c. per ft.; eight 6x6x6 c.i. tees $9.90; and four 6 in. c.i. plugs at 65c., total $2,628. **W.P.A.**

BLADE PLOWS—**Milwaukee, Wis.**—City, 45 tripping blade plows, to F. Gettleman Co., 4400 West State St., $292 each***2 V type sidewalk plows and 6 V type sidewalk plows, to Milwaukee Power Equipment Co., 525 West 22nd St., $2,100 and $2,100 respectively***4 highway V type plows, to Drott Tractor Co., Inc., 3841 West Wisconsin Ave., $1,575 each. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

†CATCH BASIN INLETS, etc.—**Milwaukee, Wis.**—Treas. Dpt., Procurement Div., 12 catch basin inlets complete and 12 grates, to Oshkosh Fdry. Co., Oshkosh, at $13 and $4.25 each respectively***12 catch basin grates, to Nortman-Dufflike Co., 2740 South 32nd St., $7.50 ***600 bbl. Portland cement and 380 bbl. Portland cement (paper bags), to W. H. Pipkorn Co., 1548 West Bruce St., $2.05***465 ft. 18 in. vitr. clay sewer pipe, to Schneider Fuel & Supply Co., 3438 West Forest Home Ave., at 77.3c. per ft. Awarded Feb. 3.

†LUMBER, etc.—**Milwaukee, Wis.**—National Park Service, furnishing lumber, to Mid City Lumber Co., 6022 West State St., $828***lumber, to A. Lentz, 1256 North 70th St., $59.20 ***structural steel expansion joints, to W. F. Eichfeld & Son, 135 East Pittsburg Ave., $397 ***250 sacks lime, to Wisconsin Face Brick & Supply Co., 4485 North Green Bay Ave., 35c. per sack***800 bbl. cement, to Froemming Corp., 4380 North Green Bay Ave., $2.72 per bbl. Bids Feb. 7.

VALVES, etc.—**Milwaukee, Wis.**—City, seven 20- to 48-in. check valves, to S. Morgan Smith Co., York, Pa., $20,372***six 24 and 60 in. butterfly valves, to Allis Chalmers Mfg. Co., 1126 South 70th St., $9,850***three 24 and 36 in. gate valves, to Kennedy Valve Mfg. Co., Elmira, N. Y., $2,224***six 54 in. suction pieces and one 54 in. blind flange, to Goslin-Birmingham, North Birmingham, Ala., $1,800. Grand total $34,246. **P.W.A.** Bids Jan. 9, awarded Feb. 5.

CEMENT, LIQUID CHLORINE, etc.—**Toronto, Ont.**—City Dpt., annual supplies of materials and equipment for 1936, city works, to Canada Cement Co. Ltd., 330 Bay St., and to Alfred Rogers Ltd., 372 Bay St., Portland cement, at $2.42 per bbl.***to Canadian Industries Ltd., 372 Bay St., liquid chlorine, $113***to John T. Hepburn Ltd., 18 Van Horne St., hydrants, 3-way with foot pipes with socket ends with frost jackets, $70.99 each, 3-way with foot pipes with victaulic ends with frost jackets, $71.99 each, additional frost jackets, $8.33 each, additional foot pipes with socket ends, $10.30 each, additional foot pipes with victaulic ends, $11.45 each***to Imperial Oil Ltd., 56 Church St., asphalt cement in barrel lots at 1¼c. per gal.***to Currie Products Ltd., 17 Birch Ave., coal tar for hot application in barrel lots at 19.1c. per gal., in tank wagon lots 14.9c. per gal., in tank wagon lots applied on the jobs, 14.9c per gal.*** to Barrett Co. Ltd., Villiers St. and The Dominion Tar & Chemical Co., Morse St., coal tar for hot application at same price as for Currie Products ***to Canada Metal Co. Ltd., 721 Eastern Ave., lead pipe at $7.20 per 100 lbs.***to Imperial Oil Ltd., 56 Church St., refined asphalt at $17 per ton in tank cars and $23.25 per ton in metal containers***to Consolidated Sand & Gravel Ltd., Harbor Commission Bldg., universal dust or filler at $4.07 per ton***to J. E. Montgomery, 95 Buttonwood Ave., sand at 64c. per ton to yard in Dist. 2***to H. L. Conlan, Highland Creek, sand at 65c. per ton***to Dual Mixed Concrete & Materials Ltd., Fleet St., sand at 68c. and 74c. per ton***to Guelph Sand & Gravel Co. Ltd., sand at 65c. per ton ***to John T. Hepburn Ltd., 18 Van Horne St., 3 in. gate valves with sockets, $28 each, 3 in. gate valves with flanges, $29.50 each, 3 in. gate valves with victaulic ends, $29.50 each, 4 in. gate valves with sockets, $39.50 each, 4 in. gate valves with flanges, $30.50 each, 4 in. gate valves with victaulic ends, $30.50 each, 6 in. gate valves with sockets, $31.85 each, 6 in. gate valves with flanges, $32.49 each, 6 in. gate valves with victaulic ends, $32.49 each, 6 in. gate valves with 1 flange, 1 victaulic end, $32.49 each, 8 in. gate valves with sockets, $65.94 each, 8 in. gate valves with flanges, $67.94 each, 8 in. gate valves with victaulic ends, $67.94 each, 12 in. gate valves with sockets, $77.70 each, 12 in. gate valves with flanges, $79.70 each, 12 in. gate valves with victaulic ends, $79.70 each***to Fergus Quarries, Fergus, ¾ in. and ½ in. crushed stone, at $1.58 per ton, ¾, 1, 1½, 2 and 3 in. crushed stone at $1.48 per ton***to Canada Metal Co. Ltd., 721 Eastern Ave., pig lead at $5.85 per 100 lbs.***to Canadian Industries Ltd., 372 Bay St., sulphur dioxide in cylinders of 150 lbs. each, $180 per ton, in cylinders of 2,000 lbs. each, $117 per ton***to Nichols Chemical Co. Ltd., 200 Bay St., basic sulphate of alumina at $28.50 per ton***to Imperial Oil Ltd., asphalt cement filler at $1.80 per 100 lbs.*** to Coulter Copper & Brass Co. Ltd., 115 Sumach St., bronze bearing castings to stand 25,000 lb. per sq.in. tensile strength at 20c. per lb.; medium bronze to stand 35,000 lb. per sq.in. tensile strength at 20c. per lb.; high strength bronze to stand 60,000 lb. per sq.in. tensile strength at 24c. per lb.; brass castings, as specified at 18c. per lb.***to John T. Hepburn Ltd., flushing shaft tops complete at $2.90 each; flushing shaft tops, frames only at $2.30 each; flushing shaft ,tops, covers only at 63c. each; gas traps complete with two bolts and nuts at $3.95 each; T.W.W. full size round valve chamber frame, cover and plug complete (edges machined), at $10.95 each, frame only $6.95 each, cover only, $4 each; plug only, 25c. each; T.W.W. ¾ size round valve chamber frame, cover and plug complete, $9.95 each; frame only, $6.90 each; cover only, $3 each; T.W.W. ½ size round valve chamber frame only, $6.75 each; T.W.W. small size round valve box, plug only, 20c. each; 2-piece round frame and cover for concrete valve and meter chamber, frame only, $9.40 each; 2-piece round frame cover only, $2.75 each; large high pressure valve chamber frame only, machined, $9.90 each; plug only, 40c. each; 4 in. off-center large high pressure valve chamber, frame only, $9.69 each; plug only, 40c. each; miscellaneous flat castings to detail at $4.25 per 100 lbs.***to T. Tomlinson Fdry. Co. Ltd., Esplanade, manhole tops, covers and frames complete (machined), at $8.99 each; manhole tops, closed covers and frames complete (machined), at $9.54 each; manhole tops, frames only (machined), at $5.60 each; manhole tops, covers only (machined), at $3.73 each; manhole tops, closed covers only (machined), $3.94 each; large double square manhole tops at $36 each; standard gully tops 24 in. frames and grates with bolts and nuts complete at $9.44 each; standard gully tops 24 in. frames only at $5.35 each; standard gully tops 24 in. grates only at $4.26 each; standard gully tops 24 in. rods and nuts only at 24c. each, T.W.W. full size round valve chamber plug only, 25c. each, T.W.W. ¾ size round valve chamber frame cover and plug complete at $8 each; T.W.W. ¾ size round valve chamber cover only at $2.73 each; T.W.W. small size round valve box, cover and plug complete 8 in. deep at $3.50 each; T.W.W. small size round valve box, cover only at $3.25 each; T.W.W. ¾ small size round valve box, cover and plug complete 8 in. deep at $3.05 each; T.W.W. small size round valve box, cover and plug complete 4 in. deep at $2.85 each; 2-piece round frame and cover for concrete valve and meter chamber complete (fitted), at $11 each; large high pressure valve chamber frame, cover and plug complete (machined), at $16 each; cover only at $6.64 each, plug only at 40c. each; 4 in. off-center large hp. valve chamber plug cover complete at $10.83 each; cover only at $4.33 each; plug only at 40 each; small hp. valve, box cover and plug complete at $4.90 each; cover only at $4 each; plug only at 40c. each; crossing plates R.H. section at $6 each; crossing plates L.H. section at $6 each; crossing plates center section at $5.95 each***to T. McAvity & Sons, Ontario Ltd., 639 Young St., alloy fittings for water service pipes, corporation cocks, for pipe ½ in. at 84c. each; corporation cocks, for pipe ¾ in. at $1.42 each; corporation cocks, iron pipe 1½ in. at $5.31 each***to Muell Ltd., Sarnia, corporation cocks for lead pipe ¾ in. at $1.13 each***to Coulter Copper & Brass Co. Ltd. (2 per cent discount 30 days), couplings lead to lead ¼ in. at 68c. each; ¾ in. at 76c. each; ½ in. at $1 each; 1 in. at $1.35 each; lead to iron ¼ in. at 41c., ¾ in. at 51c., ¾ in. at 57c. each; 1 in. at 78c. each; reducers ½- to ¾-in. at $19 per 100; ¾- to ¼-in. at $22 per 100; ¾- to ¾-in. at $25 per 100; 1- to ¾-in. at $33.50 per 100; brass plugs ¾ in. at $8.50 per 100; 1 in. at $14 per 100; 1½ in. at $27 per 100; 2 in. at $36 per 100*** to Canadian Brass Co. Ltd., Galt, corporation cocks for lead pipe 1 in. at $2.22 each; stop cocks for lead pipe ¾ in. at $3 each***to Empire Brass Mfg. Co. Ltd., Toronto, stop cocks for lead pipe ¾ in. at $2.36 each; 1 in. at $4.44 each; tee and stop cocks for lead pipe ¾ in. x ½ in. x ½ in. at $2.84 each; tee and stop cocks for ¾ in. x ¾ in. x ¾ in. at $3.91 each, tee and stop cocks for 1 in. x ¾ in. x ¾ in. at $5.39 each***to Toronto Brick Co. Ltd., 897 Bay St., sewer brick at $21 per 1,000.

FOREIGN

Argentina, Buenos Aires—State Oilfields Directorate, taking bids constructing and equipment for electrical generation station and storage depot at San Lorenzo, incl. buildings, supply Diesel engines, driven alternators and associated equipment.

Brazil, Rio de Janiero—Brazilian Government, Rio de Janiero, 3,000 tons steel rails, to U. S. Steel Corp., 30 Church St., New York, to exceed $100,000.

England—W. J. Broad, **Nottingham, city** clk., taking bids supplies for year 1936-37, incl. stoneware pipes, iron castings, refined tar, pitch, cement, lumber, etc.***Hull** Municipality preparing plans central power station, $515,000 voted***Newcastle-upon-Tyne** Municipality plans developing Brakelaw Estates, incl. houses, sewers, water system, $5,000,000***Southport** Town Clerk taking bids constructing electrical substation on Cemetery Rd.***Chinese Government Purchasing Comn., c/o Sandberg Ltd., 40 Grosvenor Gardens, **London,** in market for 180 tires, 60 axles and 126 helical springs***Feb. 20, by C. W. Radcliffe, clk., Middlesex County Council, **London,** at Guildhall, Westminster S.W., power plant at Hillington, incl. Lancashire boiler with settings, fittings, boiler feed tanks and pumps, calorifier, steam, water and condensate services***E. Atkinson, **Cousett,** preparing plans theatre for Cousett Cinemas Ltd. ***Alexander Battyre Ltd., **Bramley,** in market for complete equipment for sheet metal plant.

Mexico, Salina Cruz—Ministry of Communications, Mexico City, will award contract late in February, constructing piers and port development, Oaxaca State. To exceed $500,000.

New Zealand, Wellington—Apr. 14, by Secretary Public Wks., Supplies & Tenders Com., supply of pumping sets for cooling water for Aarpuni Power Development.

South Africa—Pretoria City Electrical Engineer L. L. Horrell, bids in spring extending primary transmission system on 11,000 volt, and a 100,000 lb. per hr. boiler and auxiliaries.

†*Federal Government.*

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Foreign (Continued)

$450,000***Pretoria Municipality voted $872,000 for constructing bridges, water-main extensions, sewers and fire tower***A. Rodwell, electrical engr., Johannesburg, Transvaal, Dpt. Johannesburg, soon takes bids installing 20,000 kw. set***A. P. Laing, city engr., East London, taking bids on city hall $500,000, and roads $121,435***Firestone Tire & Rubber Co., Port Elizabeth, plans large factory and equipment***Burban Municipality voted $300,725 for purchasing electric department, incl. pillars, transformers, $141,650 high tension cables $73,750, machinery and instruments $4,750***L. D. Oakley, city engr., Kimberley, taking bids constructing an abattoir and chilling plant, also equipment, by-product plant and refrigerating machinery***G. M. Pirie, city electric engr., Bloemfontein, preparing plans buildings, $600,000, will purchase later two 40,000 lb. k.w.h. boiler units or alternatively two 60,000 k.w.h. boiler units with suitable feed water make up plant, one 6,000 kw. turbo-generator unit with necessary switchgear, 11,000 volt with necessary coupling transformers to existing 2,200 volt supply spray cooling pond to suit requirements, one overhead crane for turbo room, necessary cables, steam and water piping to suit***H. L. Roitz, town engr., Paarl, authorized to call tenders next month for sewerage scheme, $250,000; bridge over Berg River, $210,000; 8 mi. high pressure 9 in. watermain, $125,000; chlorination plant $8,000***G. L. Miller, town electrical engr., Krugersdorp, preparing plans 4 substations with high tension and low tension distribution, conversion from low tension overhead feeder to cable and 2 mi. high tension feeder from overhead to underground cable, Plans ready in March. 1936***G. M. Pirie, city engr., Bloemfontein, will purchase 11,000 volt generator transformers $16,500; feed pumps and piping $15,000 voted; switchgear $11,150 voted, overhead crane $6,000 voted; and turbo-generator $110,000 voted; G. H. Swingler, city electrical engr., Capetown, wants prices on 33,000 volt cables and transformers, voltage regulators, and automatic switches, oscillograph and space testing instruments, Purchases to be made late in spring***Capetown Municipality bids in March constructing Dock Road Power Station $9,250,000 voted; G. H. Swingler, city engr., soon takes bids constructing distribution system $700,000; machinery $500,000 generating station $1,645,000; street lighting control equipment $50,000***Germiston Municipality plans constructing airport addition $540,000, town hall $265,000 fire engine $10,000***D. H. Honghton, city engr., Capetown, preparing plans rapid gravity filtration plant at Kloof Nek, 30,000 gal. per day capacity; wash water tank, 90,000 gal. capacity; 15 mi. distributary mains 4 and 6 in. diam. to be cleaned and cement lined $860,000; Municipality making plans extending infectious disease hospital, tenements and public baths $1,375,000.

PUBLIC BUILDINGS

PROPOSED WORK

†Ala., Birmingham—P. Wks. Administration, Div. Housing, Interior Dpt., Wash., D. C., rejected bids Dec. 2, constructing foundations for Smithfield Courts Housing Project, H-2902. Will readvertise. Noted Dec. 5, C. D.—Nov. 21, E. N.-R.

★Calif., San Francisco—Free Port, c/o Mayor, City Hall, made application to Foreign Trade Zones Bd., Wash., D. C., for establishment of free port, incl. warehouses, processing, piers, barriers, etc. To exceed $1,000,000.

★Conn., Hartford—City, Bd. Educ., W. F. Vitl, comn. Chn. plans school program, incl. Burr Junior High School, $250,000; Lawrence St. Elementary School, $500,000; Junior High School orphan asylum site, $1,000,000; Elementary School, Northwest Dist. $300,000; Junior High School New Britain Ave., $1,000,000; addition to Hartford public high school, $300,000; addition to State Trade School $100,000; New Britain Ave. Junior High School alternate 32 elementary Southwest Dist. Schools $150,000 and $300,000. Total est. $3,450,000. Architect not appointed.

Conn., Southington — Southington Hospital Corp., E. S. Todd, pres., for brick, limestone hospital, Oakland Rd. and Southington Ave. (Julia A. Bradley Trust Fund.) Project temporarily held up. Lester Beach Scheide, Inc., 100 Pearl St., Hartford, archts. A. T. Lindsey, Jr. Old Turnpike Rd., engr. Noted Dec. 23, C. D. —Dec. 26, E. N.-R.

★†Conn., Stamford—P. Wks. Administration, Div. Housing, Wash., D. C., completing plans and advertises for bids about Mar. 1, general contract 2 story and 3 story apartments, for Fairfield Ave. Housing Project, Project H-9001. $800,000. N. E. Emmens & D. C. Sanford, Jr., 33 Atlantic St., archts. Noted Dec. 9, C. D.—Dec. 12, E. N.-R.

†Ind., Evansville — P. Administration, Div. Housing, Wash., D. C., rejected bids constructing foundations for Lincoln Gardens Housing Project, H-3801. Will readvertise. Noted Dec. 19, C. D.

La., Jonesboro—Jackson Parish Police Jury, Jonesboro, plans by J. W. Smith & Associates, and H. H. Land, Monroe, new 2 story courthouse, incl. jail on roof. $200,000.

†Md., Bethesda — Treas. Dpt., Procurement Div., Wash., D. C., making plans and soon takes bids constructing experimental station. $100,000.

†Massachusetts—See "Unclassified."

Federal Government.

★Massachusetts — Commonwealth of Massachusetts, Boston, plans following construction projects for year 1936. Legislative action is awaited on all the projects and architects or engineers have not yet been selected. By Dpt. Mental Diseases, Dr. W. Overholser, comr., State House, Boston, Buildings—employees dormitory at Wrentham State School $135,000, ward building at Grafton State Hospital $575,000, infirmary at Wrentham State School $160,000, hospital alterations at Taunton State Hospital $10,000, male employee's building at Westboro State Hospital $200,000, married couples home at Grafton State Hospital $150,000, infirmary alterations at Northampton State Hospital $20,000, storehouse addition at Grafton State Hospital $60,000, hospital group at Bridgewater State Farm $1,750,000, nurses home at Gardner State Hospital $72,000, at Grafton State Hospital $90,000, male attendants home at Gardner State Hospital $95,000, employees home at Foxboro State Hospital $150,000, administration building at Danvers State Hospital $75,000, dormitory at Foxboro State Hospital $50,000, total $3,592,000; power plant equipment and alterations as follows, generators at Taunton State Hospital $70,000, generators, boilers and stokers at Worcester State Hospital $270,000, total est. $340,000; sewers—additional sewer beds at Westboro State Hospital $50,000, at Grafton State Hospital $22,000; Miscellaneous—pointing and painting of buildings at Westboro State Hospital $5,000, plumbing at Worcester State Hospital $10,000, laundry equipment at Gardner State Hospital, $6,000, total est. $21,000; Fire Prevention—sprinkler system at Worcester State Hospital $08,200, Danvers State Hospital $110,300, Westboro State Hospital, $83,300, Gardner State Hospital, cost indefinite*, Northampton State Hospital $34,500, Taunton State Hospital $62,100, Foxboro State Hospital $52,300, Monson State Hospital $83,300, total est. $524,000 plus*; By Dpt. Educ., G. H. Varney, bus. agt., State House, Boston, building addition at Lowell Textile Institute, $150,000; power house alterations at Framingham Teachers College $3,000, classroom building at Amherst State College $39,000, dormitory alterations at Bridgewater Teachers College $10,000, telephone system at Amherst State College $10,000, electric system at Amherst State College $2,000, at Bridgewater Teachers College $2,000, fire protection at Amherst State College $15,000, flooring at Bridgewater Teachers College, $4,000, total est. $235,000; By. Superintendent Buildings, State House, Boston, new wing addition at State House, $1,000,000, renovate present clock system in State House $1,800, new meters and boilers in State House $1,600, total est. $1,003,400. Total $5,787,400 plus.

Mass., Attleboro—City, Building Comn., City Hall, plans by Higgins & Johnston, 24 Park St., 2 or 3 story, basement city hall, North Main St. To exceed $150,000. Application to P.W.A. for funds.

Mass., Marion — Town, H. G. Chittim, supt. Schools, plans by Frank Irving Cooper Corp., 47 Winter St., Boston, 3 story, basement, brick, steel Junior High and Grade School, concrete found. To exceed $150,000.

Mich., St. Joseph—Bd. Educ. plans by Jos C. Llewellyn Co., 38 North Dearborn St., Chicago, Ill., 2 story, basement, 110x150 ft., brick, rein.-con. high school, plain found. $160,000.

Minn., Hibbing — Village, Water, Power & Building Comn., J. P. Murphy, secy., making plans generating project at municipal heating and generating plant, furnishing, installing boiler and auxiliary equipment. P.W.A. project. Burlingame & Hitchcock, 521 Sexton Bldg., Minneapolis, engrs.

†Minn., Minneapolis—P. Wks. Administration, Div. Housing, Wash., D. C., rejected bids Dec. 6, constructing foundations for Summerfield Housing Project, H-4201. Will readvertise. Noted Dec. 13, C. D.—Nov. 14, E. N.-R.

†Minn., Winona—Biological Survey, Upper Mississippi River Wild Life and Fish Refuge, R. C. Steele, supt., 225 P. O. Bldg., soon takes bids 2 story, warehouse, boatyard, marine railroad, dredge boat harbor barge loading facilities $25,000.

Mo., Excelsior Springs — City rejected bids Feb. 15, constructing 5 story, basement mineral water building. Will readvertise. Black & Veatch, 4706 Bway., Kansas City, engrs. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

Mo., St. Louis—City, B. L. Brown, pres. Bd. P. Service, City Hall, plans by A. Osburg, City Hall, three 1 story, basement, brick, stone police stations with attached garages, $480,000. P.W.A. project. W. C. E. Becker, city engr.

★N. Y., Binghamton—Bd. Educ. soon takes bids constructing superstructure for Senior High School. Total cost $800,000, incl. equipment. P.W.A. project. L. J. Kaley, 70 Court St., archt. Noted Jan. 17, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

N. Y., Glens Falls—Union Free School Dist. 1, Queensbury, soon takes bids constructing school, Sagamore and Jackson Aves., $342,000; Union Free School Dist. 18, Queensbury, soon takes bids constructing school, $150,000, P.W.A. project. Tooker & Marsh, 101 Park Ave., New York, archts. Noted Nov. 14, C. D.—Oct. 3, E. N.-R.

N. Y., Schenectady—Div. Military & Naval Affairs, Albany, rejected bids Jan. 31, electrical work and special fixtures for State Armory. Noted Feb. 4, C. D.

N. Y., Utica—Dpt. Mental Hygiene, State Office Bldg., Albany, soon takes bids constructing new assembly hall and service connections, altering main building and assembly hall for patient accommodations. $303,000. W. E. Haugaard, Albany, state archt.

O., Cleveland—Great Lakes Exposition Co., L. Dickey, genl. mgr., 1803 Terminal Tower, making plans for two substations and electric distribution lines for proposed 3 months exposition. A. H. Heidenrich, 1803 Terminal Tower, engr.

O., Clyde—Bd. Educ. plans by C. H. Shively, Fremont, high school, $200,000.

†O., Toledo—P. Wks. Administration, Housing Div., Wash., D. C., rejected bids Dec. 6, constructing foundations for Belmont Div. Housing Project H-2601. Will readvertise. Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

†Okla., Enid—P. Wks. Administration, Div. Housing, Wash., D. C., rejected bids Dec. 9, constructing foundations for Enid Springs Park Housing Project, H-5401. Will readvertise. Noted Dec. 27, C. D.—Dec. 19, E. N.-R.

Pa., Phila.—City plans cleaning and sandblasting city hall, reconditioning footways and plaza, renovating city hall annex, Independence Hall, Convention Hall, Commercial Museum, $70,000. M. J. McLaughlin, dir. Dpt. P. Wks., City Hall Annex.

Pa., Wilkes-Barre—Wilkes-Barre School Bd., W. E. Doron, pres., plans by T. A. Foster, Brooks Bldg., new school, Rolling Mill Hill. $175,000-$200,000.

R. I., Cranston—City, City Property Comn., City Hall, plans by Howe & Church, 1014 Turks Head Bldg., Providence, 3 story, basement, new city hall. $270,000.

†Tenn., Memphis — Public Wks. Administration, Housing Div., Wash., D. C., rejected bids Nov. 11, constructing foundations for Lauderdale Avenue Housing Project, H-3103. Will readvertise. Noted Dec. 11, C. D.—Oct. 24, E. N.-R.

†Tenn., Memphis — P. Wks. Administration, Div. Housing, Wash., D. C., rejected bids Dec. 6, constructing foundations for Poplar Avenue Housing Project, H-3401. Will readvertise. Noted Dec. 11, C. D.—Nov. 7, E. N.-R.

†Tenn., Nashville—P. Wks. Administration, Housing Div., Wash., D. C., rejected bids Dec. 2, foundations for Sixteenth Avenue Housing Project, H-2102. Will readvertise. Noted Dec. 5, C. D.—Nov. 21, E. N.-R.

†Tex., Galveston—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Jan. 10, constructing senior medical officers' quarters and pump house. Noted Jan. 16, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

†Tex., Houston—Treas. Dpt. at office Sup. Archt., Wash., D. C., revised plans for parcel post building. Bids Jan. 29 rejected. Noted Feb. 3, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

★Tex., Wichita Falls—City, turned down offer of P.W.A. for $490,000 grant to help finance construction of municipal light plant. Total est. $1,750,000. Voelcker & Dixon, Wichita Falls, engrs. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

★†Wash., Spokane—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Jan. 30, constructing U. S. Post Office, Havermale Island. $650,000. Noted Feb. 3, C. D.—Dec. 26, E. N.-R.

B. C., Vancouver—University of B. C., Point Grey, plans by Sharp & Thompson, 626 Pender St. W., 2 story, rein.-con. students' union office building and athletic building, University site. $150,000.

Ont., Cornwall—Dundas, Stormont and Glengarry Counties plan constructing sanatorium. $200,000. Architect not appointed. Noted June 14, C. D.—June 20, E. N.-R.

★Que., Sherbrooke — Municipality making plans constructing power plant at Trois Miles. $500,000. T. Trembley, city engr.

Sask., Regina—City plans by City Architect for housing scheme. $250,000. Spring tendering.

†Finland, Helsingfors — State Dpt., Wash., D. C., plans constructing consulate building, Seaboard District. $150,000. Site acquired. Architect not appointed.

BIDS ASKED

Ala., Montgomery—Mar. 2 (extended date), by City, J. M. Garrett, engr., 2 story, basement, 131x311 ft., brick, rein.-con. city hall, Perry and Monroe Sts. Est. $175,000. P.W.A. project. F. Lockwood, 121 Adams St., archt. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

†Ill., Chicago—Mar. 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., altering smoke exhaust system in U. S. Post Office.

†Ill., Chicago — Mar. 20, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing postal station "Kedzie-Grace."

†Ill., Galesburg—Mar. 6 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Jan. 23, E. N.-R.

Ill., Peoria—Mar. 19, by Bd. Local Inspections, School Dist. 150, constructing school, P.W.A. project. Jameson & Harrison, Peoria Life Bldg., archts. Noted Nov. 25, C. D.—Nov. 28, E. N.-R.

†Ill., Quincy—Mar. 10 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office and

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Public Buildings (Continued)

Court House. Noted Feb. 10. C. D.—Feb. 13, E. N.-R.

Ind., Kouts—Feb. 29, by Pleasant Twp., A. Honchouse, trustee, 2 story, basement, brick high school and remodeling present grade school. $167,000. P.W.A. project. C. E. Miller, 210 Union Trust Bldg., South Bend, archt. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

Kan, Iola—Feb. 25, by Mayor, constructing 385 ft. rein.-con. dam 10 ft. high for light plant improvements. $50,000. Paulette & Wilson, Topeka, engrs. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

†Kan., McPherson—Mar. 16, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office, $75,000.

La., Alexandria—See "Contracts Awarded."

La., Natchitoches—Feb. 29 (extended date), by A. A. Fredericks, pres., La. State Normal School, Baton Rouge, constructing library building, $150,000. Weiss, Dreyfours & Seiferth, Maison Blanche Bldg., New Orleans, archts. Noted Jan. 24, C.D.—Jan. 30, E.N.-R.

Mass., Holyoke—City, Municipal Offices, City Hall, taking bids 1 and 2 story, 100 x 180 ft., brick, steel, stone auditorium, Maple and Appleton Sts. $200,000. Franz & Cunniff, 316 High St., archts.

Mass., Lee — Feb. 24, (extended date), by Town, Bd. Selectmen, Town Hall, 2 story, basement, 130x138 ft., brick, steel, marble, high school addition concrete found. P.W.A. project. M. W. Maloney, 220 Dwight St., Springfield, archt. Noted Feb. 13, C. D.

Mass., North Grafton—Feb. 24, by Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, Dr. W. Overholser, comr., furnishing, installing 2 pressure oil burners in Grafton State Hospital.

†Mass., Worcester—Mar. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing parcel post building. $290,000. Noted Oct. 17, E. N.-R.

†Mont., Missoula—Mar. 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., passenger elevator and dumbwaiter for U. S. Post Office and Court House annex.

N. Y., Dannemora—Mar. 5 (extended date), by Dpt. Correction, State Office Bldg., Albany, construction, heating, sanitary and electrical work, special electric fixtures, installing electric elevator for cell block and administration building, Clinton Prison. To exceed $150,000. Noted Feb. 14, C. D.—Feb. 6, E. N.-R.

†N. Y., New Rochelle—Feb. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., clearing site for remodeling and enlarging present U. S. Post Office.

N. Y., New York—See "Contracts Awarded."

N. Y., Oneida—Feb. 28, by City, J. M. Mead, mayor, clearing site, excavating and foundations work for municipal hospital. $300,000. P.W.A. project. King & King, 300 Dennison Bldg., Syracuse, archts. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

†N. Y., Rochester—Mar. 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling (except elevator) U. S. Court House. $100,000.

N. Y., Wingdale—Feb. 26, by Dpt. Mental Hygiene, State Office Bldg., Albany, constructing assembly hall and service connections at Harlem Valley State Hospital. W. E. Haugaard, State Office Bldg., Albany, archt.

N. D., San Haven — Mar. 2, by State Bd. Administration, E. G. Wanner, secy., Capitol, Bismarck, constructing power house and mechanical equipment; also heating, plumbing, electrical work for 6 story-infirmary building at State Tuberculosis Sanatorium. E. F. Kurke, Fargo, engr. P.W.A. project.

O., Ironton — Mar. 4, by H. W. Mountain, chn. Lawrence Co. Bd., superstructure and equipment for Lawrence County Hospital, 3 story, basement, 142x160 ft., brick, concrete. $277,596. P.W.A. project. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

Pa., Waynesboro—Feb. 25, by School District of Boro of Waynesboro, Franklin Co., brick, steel school building. $321,900. Lawrie & Green, 3rd and Forster St., Harrisburg, archts. Noted Oct. 23, C. D.—Oct. 31, E. N.-R.

Pa., Wilmerding—Feb. 28, by School Dist., Boro of Wilmerding, brick, steel school building, Marguerite Ave. $200,000. Hunter & Caldwell, 3601 5th Ave. Altoona, archts. Noted July 31, C. D.—Aug. 8, E. N.-R.

S. C., State Park—Feb. 26, by J. A. Hayne, secy., State Bd. Health, Columbia, constructing 1st unit of hospital building for sanatorium, at State Park. J. B. Urquhart, Columbia, archt.

★ **†Tenn., Memphis**—Mar. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Marine Hospital (except elevators). $535,000.

†Va., Quantico—Feb. 26, by Yards & Docks, Navy Dpt., Wash., D. C., constructing, improving bachelor officers quarters, at Marine Barracks, Spec. 8080.

Wis., Milwaukee—Feb. 29, by H. W. Tullgren, archt., 1234 North Prospect St., constructing 3 story, basement, 120x150 ft., Bedford stone, brick consistory, North Van Buren Ave., for Wisconsin Consistory, 714 East Wells St. $225,000. Noted Dec. 16, C. D.—Dec. 19, E. N.-R.

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†T. H., Pearl Harbor—Mar. 25, by Yards & Docks, Navy Dpt., Wash., D. C., remodeling building and for electrical equipment at Navy Yard, Spec. 8051.

†Puerto Rico, San Juan—Mar. 3, by P. Wks. Administration, Div. Housing, Dpt. Interior, Wash., D. C., constructing superstructures of Caserio Mirapalmeras Housing Project. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

LOW BIDDERS

★ **†Ind., Indianapolis** — Treas. Dpt. at office Sup. Archt., Wash., D. C., Feb. 14, extending, remodeling U. S. Post Office, from Henry Dattner, 1515 Barlum Tower, Detroit, Mich., $1,387,352. Noted Jan. 22, C. D. — Jan. 30, E. N.-R.

★ **N. Y., New York**—W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. extension and Concord St., Brooklyn, general contract P. S. 113, for Bd. Educ., 500 Park Ave., from National Excavation Corp., 295 Madison Ave. (A) $1,026,000***from J. Weinstein & Rubin Building Corp., 66 Court St., Brooklyn, (B) $1,008,700***excavating, grading for Bronx Industrial High School for Girls from Paladino & Muratore, 439 East 143rd St., $12,445. Noted Jan. 31, C. D.—Feb. 6, E. N.-R.

CONTRACTS AWARDED

†Ala., Gadsden — Treas. Dpt. at office Sup. Archt., Wash., D. C., furnishing, installing 1 passenger elevator in U. S. Post Office, to General Elevator Co., 610 Whitehall St. S.W., Atlanta, Ga., $6,795. Bids Oct. 14. Noted Oct. 21, C. D.—Oct. 3, E. N.-R.

Calif., Mariposa—W. Spivock, general contractor, 544 Golden Gate Ave., San Francisco, painting for high school additions, to J. J. Burdon, 57 Athol Ave., Oakland, for Mariposa High School Dist. **P.W.A.** Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Calif., Reading—B. A. Howkins & Co., general contractors, 1182 Market St., San Francisco, heating and plumbing for grammar school, to G. C. Motley, Klamath Falls, Ore., for Redding Elementary School Dist.***electrical work, to American Electric Constr. Co., 462 Bryant St., San Francisco***painting, to R. P. Paoli, 3159 Fillmore St., San Francisco***reinforcing steel, to Bethlehem Steel Co., 20th and Illinois Sts., San Francisco***steel sash and iron grille work, to Schrader Iron Wks., 1247 Harrison St., San Francisco. Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

†Calif., Santa Barbara—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Sarver & Zoss, Inc., 1015 West 4th St., Los Angeles, $341,500. Bids Feb. 4. Noted Feb. 7, C. D.—Jan. 23, E. N.-R.

Conn., Guilford—E. and F. Constr. Co., general contractors, 94 Wells St., Bridgeport, sheet metal work for high school, to Johnson Lindahl Co., 99 Franklin Ave., Hartford for Town, School Bd.*** millwork, to Frank Miller Lumber Co., 125 East Main St., Bridgeport***bar joists, to Truscon Steel Co., 42 Church St., New Haven. Noted Feb. 3, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded"

Conn., Hartford—See "Unclassified."

Conn., Middlebury — Town, H. E. Bronson, selectmen, 2 story, basement, brick, steel, granite town hall, to Allyn Wadhams Co., 15 Lewis St., Hartford. Noted Jan. 17, C. D.—May 2, E. N.-R.

Conn., South Windsor—Richard Johnson Co., general contractors 387 Park St., Hartford, heating for 2 story, basement, 65x100 ft, school, to Libby & Blinn, Inc., 135 Sheldon St., Hartford, for Town, Bd. Selectmen***plumbing, to Byrnes-Millward Co., 26 High St., Hartford***building finish, to New Britain Woodworking Co., 55 Pearl St., New Britain***electrical work to Perry Electric Co., 480 New Britain Ave. Hartford*** reinforcing steel, to Scherert Steel Co., Inc., High St., Hartford***structural steel and iron, to Standard Structural Steel Co., 1014 Wethersfield Ave., Hartford***painting, to W. A. Crossup, 372 Trumbull St., Hartford***roofing, to Johnson Lindahl, Inc., 99 Franklin Ave., Hartford***marble, to Central Marble & Tile Co., 56 Sanford St., Hartford. Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

†D. C., Wash.—Con. Q.M., Army Medical Center, altering heating and ventilating for Northwest Wing, Army Medical Center, to Norair Eng. Corp., 1114 18th St., $5,700***manufacturing and installing cubicles, to Dahlstrom Metallic Door Co., Jamestown, N. Y., $37,822.

Idaho, Boise—City Comrs., general contract Junior High School and gymnasium, to J. O. Jordan & Son, Boise, $291,898 and $96,978 respectively***plumbing and heating for gymnasium, to Lessinger Plumbing & Heating Co., Boise, $12,212. Grand total $401,088. **P.W.A.** Bids Jan. 24. Noted Jan. 30, C. D.—Jan. 16, E. N.-R.

Ill., Aurora — School Dist. 131 of Aurora, Kane Co., general contract 3 story, 70x126 ft., rein.-con., stone high school addition, to Langlois Constr. Co., Berwyn, Ill., $129,392***heating, to Gallaher & Speck, 546 West Harrison St., Chicago, $18,983***plumbing, to E. J. Farrell Co., Chicago, $8,815***electrical wiring, to L. H. Lamont Co., 9 South Clinton St., Chicago, $10,170. Grand total $167,350. **P.W.A.** Bids Jan. 8. Noted Dec. 27, C. D. — Jan. 2, E. N.-R.

†Ill., Chicago — Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling U. S. Marshal's suite, 4 new cells, counters, etc., to Mutual Contg. Co., 2532 Warren Blvd., $5,406.

Kan., Kansas City—City, excavation and foundation only for grain elevator and [illegible] Morrison-Glasscock & Connor Co., [illegible] Bldg., $105,172. Noted Dec. 16, C. D. [illegible] E.N.-R.

La., Alexandria — Mayor and Bd. [illegible] furnishing all labor and material and [illegible] tion of 175 ft. high, on pile found., [illegible] rein.-con. chimney for power plant, to [illegible] Co., Clark Bldg., Pittsburgh, Pa., [illegible] furnishing 1,500 Westinghouse Type [illegible] mountings, parts or equivalent for [illegible] indoor to outdoor meters, to Electric [illegible] Magazine St., New Orleans, $4,480*** two 500 hp. forged steel sectional head [illegible] tubes boilers to operate at 450 lbs. [illegible] accessories delivered f.o.b. Alexandria [illegible] plant and furnishing two boiler feed [illegible] 500 hp. boilers at 450 lb. gage [illegible] power plant, to A. M. Lockett & Co. [illegible] Bldg., New Orleans, $31,440 and $[illegible] spectively. Grand total $45,535. Bids [illegible] awarded Feb. 4. Feb. 26, by Commissioners [illegible] furnishing all labor and materials [illegible] mon brick for reconstructing old boiler [illegible] city power plant, furnishing 50,000 [illegible] and 20,000 lb. high temperature cement, former bids rejected. Noted Jan. 24, C. D.—[illegible] 1934, E. N.-R.

†Me., Eastport—U. S. Eng., Eastport 1 story, 60x60 ft. shop building, to Stefco Steel Co., Michigan City, Ind., $4,114. Bids Jan. 31, awarded Feb. 10. Proposals on warehouses have been cancelled. Noted Jan. 23, C. D.

†Me., Farmington—W. MacDonald Constr. Co., general contractors, 3829 West Pine Blvd., St. Louis, Mo., painting U. S. Post Office, to J. T. Duncaut Sons, Lewiston***electrical work to A. and R. Simpson Co., 331 Lisbon St., Lewiston, for Treas. Dpt. at office Sup. Archt., Wash., D. C. Noted Oct. 29, C. D.—Oct. 31, E. N.-R., under "Contracts Awarded."

Me., Westbrook—**F. W. Cunningham** & Sons, general contractors, 181 State St., Portland, heating and plumbing for high school, to F. N. Cunningham Co., 363 Cumberland Ave., Portland, for City, R. K. Jordan, mayor City Hall***electrical work, to L. W. Cleveland Co., 441 Congress St., Portland***reinforcing steel, to Concrete Steel Co., 294 Wash. St., Boston, Mass.***iron and structural steel, to Mcquier & Jones Co., 31 Pearl St., Portland***roofing to M. B. Bourne & Son, 216 Federal St., Portland***painting, to E. A. McGlauflin, 167 Leland St., Portland***steel erection by general contractor. Noted Dec. 31, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Mass., Fitchburg—City, alterations and additions to boiler house at Brown School, to D. M. Dillon Steam Boiler Wks., Inc., Cracker St., about $35,000. Awarded Feb. 5. Noted Oct. 18, C. D.—Oct. 24, E. N.-R.

Mass., Middleboro—J. N. Fish, general contractor, 2 Fairfax St., Dorchester, heating for 2 story, basement court house addition, to P. A. Dolan, 237 Broadway, Boston, for Town, L. F. Harding, chn. Building Comm., Town Hall***electrical work, to E. N. Niles, Middleboro***reinforcing steel, to Barker Steel Co., 238 Main St., Cambridge***miscellaneous iron and structural steel, to John E. Cox Co., Inc., 53 Davol St., Fall River***painting, to J. Wilmot, Middleboro***plumbing, to S. J. Connolly, 2453 Wash. St., Roxbury***steel erection, to O. H. Horovitz, 31 Montrose St., Newton. **P.W.A.** Noted Dec. 26, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded."

Mass., Plymouth—D'Amore Constr. Co., general contractors, 89 State St., Boston, heating for high school, Lincoln St., to Florence & Abbott, Inc., 79 Sudbury St., Boston, for Town, E. H. Donovan, chn. Building Comm. Noted Feb. 3, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

Mass., Waltham—Middlesex Co., W. C. Wardwell, chn., Court House, East Cambridge, general contract 2 story, basement, 38x136 ft., and 40x512 ft. ward building, surgical wing and dining room at County Hospital, to Thos. O'Connor & Co., 238 Main St., Cambridge, $397,500. Bids Feb. 4, awarded Feb. 7. Noted Feb. 10, C. D.—Jan. 30, E. N.-R.

Mich., Highland Park—Dpt. Street Railways, general contract brick, steel, rein.-con. garage, 2nd and La Belle Aves., to H. M. Martens Co., 2111 Woodward Ave., Detroit, $8,677***plumbing and heating, to R. L. Spitzley Plumbing & Heating Co., 1200 Fort St., Detroit, $19,177***ventilating equipment, to J. W. Parlan, 14290 Goddard Ave., Detroit, $2,258***electrical work, to Triangle Electric Co., 40 Custer St., Detroit, $12,919***gas and oil equipment to L. W. Phillips, 2842 West Grand Blvd., $10,372***sprinkler, to Viking Sprinkler Co., 1125 East Milwaukee Ave., Detroit, $4,115. Grand total $160,518. **P.W.A.** Noted Jan. 30, C. D.

Minn., Buffalo—Bd. Educ., general contract 2 story, basement school, to Standard Constr. Co., 215 South 6th St., Minneapolis, $118,034***heating and plumbing, to Healy Plumbing & Heating Co., 278 West Kellogg Blvd., St. Paul, $25,471***wiring, to Commonwealth Electric Co., 417 Bway., St. Paul, $10,373. Grand total $153,878. **P.W.A.** Bids Jan. 28. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

Minn., Clear Lake—Bd. Educ., general contract high school, to Ernest Anderson, Clear Lake. Est. $160,000.

Minn., Windom—Village, furnishing, installing 2 diesel engines driven generating units, incl. fuel storage tanks, cooling tower, etc., in municipal power plant, to Busch-Sulzer Co.

†*Federal Government*

Public Buildings (Continued)

3300 South 2nd St., St. Louis, Mo., $53,930. Bids Feb. 3. Noted Jan. 23 C. D.

Mo., Maysville—DeKalb Co., excavating and wrecking old building for 3 story court house, to Bond Building & Wrecking Co., 6801 East 15th St., Kansas City, $4,375. P.W.A. Bids Jan. 15. Noted July 16, C. D.—July 18, E. N.-R.

N. J., Hohokus—Bd. Educ., heating and ventilating for Senior High School, to F. A. McBride, 323 Grand St., Paterson, $22,987. P.W.A. Former contract rescinded. Noted Jan. 15, C. D. —Jan. 23, E. N.-R.

Mo., St. Louis—M. P. Rosemeyer, Inc., general contractors, 4817 Oleatha Ave., excavating for 1 story basement, 78x81 ft. reinforced concrete, brick, police station with 53x68 ft. attached garage, on Hampton Blvd. near Reber Pl., for City, Bd. Public Service, City Hall, to Carlo Motor Service Co., 3126 Olive St.***waterproofing, to Contract Waterproofing Co., Railway Exchange***granite, to Pickel Stone Co., 1320 South Vandeventer St.***brick and tile, to A. Viermann Bricklaying Co., 4651 South Bway.***terra cotta, to Winkle Terra Cotta Co., 5739 Manchester St. ***iron and steel, to Kaysing Iron Wks., 2701 North 25th St.***precast roof tile, to Federal American Cement Tile Co., Loudermann Bldg.*** sheet metal and aluminum, to Western Sheet Metal Wks., 4466 Finney St.***millwork, to Steimke Mfg. Co., 4096 Bingham St.***jail work, to Pauly Jail Building Co., 2215 DeKalb St.***hollow metal work, fire and Kalemein doors, metal windows, to Lasar Mfg. Co., 1313 North 16th St.***roofing, to Trinidad Asphalt Mfg. Co., 600 South Theresa St.***painting, to A. F. Koedding, Jr., 5611 Wabada St.***marble and terrazzo, to St. Louis Terrazzo & Marble Co.***plumbing, to S. Burman & Co., 2814 Olive St.***heating, to T. J. Sheehan Co., 2233 Olive St.***electrical work, to E. P. Allison Co., Inc., Loudermann Bldg. P.W.A. Bids Dec. 27. Noted Jan. 14, C. D.—Dec. 12, E. N.-R., under "Contracts Awarded."

★**Mo., University City**—School District, H. A. Frank, pres. Bd. Educ., 6701 Delmar Blvd., 2 story, basement, 80x132x100x40 ft. and 1 story, basement, 38x94 ft. addition and auditorium for Senior High School, at Jackson and Balson Aves., and general contract 3 story, 57x69 ft. south wing addition, Jackson Grade School, Jackson and Balson Aves., to Woermann Constr. Co., 3800 Pine St., $183,345 and $47,085 respectively***electrical work for Senior High School and for Junior High School, to S. C. Sachs, Inc., 817 North 9th St., St. Louis, $31,185 and $26,782 respectively***heating and ventilating, for Senior High School, to Sodemann Heat & Power Co., 2306 Delmar Blvd., St. Louis, $47,618***plumbing, to J. Sheehan Plumbing Co., 1609 Olive St., St. Louis, $5,539 ***general contract 2 story, basement, 144x194 ft. Junior High School, to Dickie Constr. Co., 517 Louderman Bldg., St. Louis, $282,978*** plumbing, to Fowler Plumbing Co., 3740 South Grand Blvd., St. Louis, $19,727***heating and ventilating, to Peters-Eichler Heating Co., 1516 Pine St., St. Louis, $45,287. Grand total $689,546. Bids Jan. 15. Noted Feb. 7, C. D.—Jan. 9, E. N.-R.

Mo., University City—Dickie Constr. Co., general contractors, 517 Loudermann Bldg., St. Louis, brick work for Junior High School, 2 story, for School Dist., H. A. Frank, pres., Bd. Educ., 6701 Delmar Blvd., to A. Viermann Bricklaying Co., 4651 South Bway., St. Louis ***caulking, to Zumwalt Co., 1716 Lafayette St., St. Louis***cut stone, to Heltonville Limestone Co., Bedford, Ind.***kalamein work, to St. Louis Fire Door Co., 1134 South 6th St., St. Louis***metal door frames, to Biedringhaus, Inc., 5739 Natural Bridge Ave., St. Louis*** cement floor finish, to H. A. Dailey, Inc., 4108 Clayton Ave., St. Louis***waterproofing, to Western Waterproofing Co., Syndicate Trust Bldg., St. Louis***linoleum and accoustical work to Hamilton Co., Inc., 4339 Lindell Blvd., St. Louis***terrazzo, to Giudicy Marble, Tile & Terrazzo Co., 3805 Eiler St., St. Louis*** glass and glazing, to Pittsburgh Plate Glass Co., 3900 Chouteau Ave., St. Louis***finish hardware, to Shapleigh Hardware Co., 315 Washington St., St. Louis***gypsum roof, to W. D. Gypsum Co., Loudermann Bldg., St. Louis*** structural steel, to Stupp Bros. Bridge & Iron Co., 3800 Weber Rd., St. Louis***miscellaneous iron work, to Columbia Iron Wks., Inc., 4254 Vista St., St. Louis***marble, to Bradbury Marble Co., 3401 Morganford St., St. Louis***tile work, to Mid-West Tile Co., 3418 Vista St., St. Louis***cabinet work, to G. A. Hassemann & Sons Mfg. Co., 2357 South 7th St., St. Louis***mill work, to McClelland Co., Davenport, Ia.***painting, to C. Raftery Painting Co., 772 Bayard St., St. Louis***plastering, to G. F. Robertson Plastering Co., 3829 West Pine St., St. Louis***composition roofing, to South St. Louis Slate & Tile Mfg. Co., 6147 Manchester St., St. Louis***tile roofing, to Lloyd Roofing Co., 6147 Delmar St., St. Louis*** sheet metal work, to J. Brodden Sheet Metal Wks., 4659 Page St., St. Louis***stair work, to Missouri Stair Co., 4205 Forest Park St., St. Louis***steel sash, to Hope's Windows, Inc., Chemical Bldg., St. Louis***blackboards, to G. A. Caine, Chemical Bldg., St. Louis*** wood block flooring, to Midland Creosoting Co., Granite City, Ill.***hardwood flooring, to Missouri Floor Co., 4350 Duncan Ave., St. Louis. P.W.A. Noted Feb. 11, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

Nev., Las Vegas—Las Vegas Bd. Educ., general contract school, to O. L. Clark, 369 North Ridgewood Pl., Los Angeles. Est. $165,000.

P.W.A. Bids Dec. 14. Awarded Feb. 5. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

★**New Jersey**—Quartermaster General S. H. Barlow, Trenton, (a) general contract (b) structural steel (c) heating and ventilating (d) plumbing (e) electrical work (f) heating (g) steel and iron (h) steel (1) Mount Holly Armory (2) Camden Armory (3) Orange Armory (4) Red Bank Armory (5) Salem Armory (6) Trenton Armory (7) Westfield Armory, to G. W. Cook, Mount Holly (a1) $29,142***to Karno Smith Co., Broad St. Bank Bldg., Trenton, (a2) $40,000, to E. M. Johnson, Inc., 706 Bergen Ave., Jersey City (a3) $42,470***to A. A. LaFountain, Railroad Ave. and Beech St., Hackensack (a4) $50,700***to Hadley Contg. & Constr. Co., Palmyra (a5) $37,452***to Fowler Thorne Co., 211 North Montgomery St., Trenton (a6) $81,747***to Gaspar Falco, 602 1st Ave., Elizabeth (a7) $42,835***to Breen Iron Wks., Breen St., Hillside (b1) $8,400 (g4) $16,072***to Oltmer Iron Wks., Ft. Manhattan Ave., Jersey City (b2) $14,008 (g3) $14,587 ***to P. Slack & Son, 211 Perry St. (c1) $4,476 (d1) $2,043 (f2) $13,306***to J. H. Nelles Co., 835 Bergen Ave., Irvington (c3) $6,130***to Leston Co., 163 East Front St., Trenton (c5) $4,930 (d5) $2,320***to W. E. Bittner, 2015 Hamilton Ave., Trenton (c6) $9,530***to G. J. Tobin, 187 North Plainfield Ave., Plainfield (d6) $6,920 (e7) $8,640*** to Jaehnig & Peoples, 221 13th Ave., Newark (d2) $3,852 (d3) $5,252 (d7) $1,724***to P. Pfeiffer, 126 West State St., Trenton (e1) $4,378 (e2) $3,587 (e4) $5,755 (e6) $4,785 ***to J. J. Tomasilo & Co., 531 Westfield Ave., Poselle Park (e7) $4,190***to W. E. Snell, Vineland (e5) $3,665***to Commercial Electric & Mach. Co., 180 Mulberry St., Newark (e3) $5,495***to Foran Fdry. & Mfg. Co., Flemington (h5) $12,522 (g6) $32,540***to Selbach Meyer Co., 661 22nd St., West New York (h7) $15,595. Grand total $539,048. P.W.A. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

N. J., Hackensack—Bergen Co., general contract constructing hospital, Bergen Pines, to Reliable Constr. Co., 604 Anderson Ave., Grantwood, $259,400***structural steel and iron, to Breen Iron Wks., 272 Badger Ave., Newark, $18,945***plumbing, drainage, heating and ventilating, to G. J. Tobin, 187 North Ave., Plainfield, $46,997 and $41,646 respectively***electrical work, to Hasbrouck Contg. Co., 240 Main St., $52,411***elevators and dumbwaiters, to Burwak Elevator Co., 227 Fulton St., New York, $14,009. Grand total $433,408. P.W.A. Noted July 31, C. D.—Aug. 5, E. N.-R.

N. J., New Brunswick—Middlesex Co., constructing hospital, water supply lines, to General Trucking & Supply Co., Woodbridge, $2,300.

N. J., Trenton—State Dpt. Institutions & Agencies, heating and ventilating for fireproofing and reconstructing wards Westside Main Building, to G. J. Tobin, 187 North Ave., Plainfield, $19,378. P.W.A. Noted Dec. 18, C. D. —Dec. 26, E. N.-R.

N. J., Vineland—City, constructing structural steel for power plant, to F. M. Weaver & Co., Lansdale, $35,432***electric crane, to Maris Bros., 56th and Grays Aves., Phila., Pa., $6,190***coal handling equipment, to Fairfield Eng. Co., Marion, O., $6,606***steam generating equipment, to Babcock & Wilcox Co., 85 Liberty St., New York, N. Y., $87,749***turbogenerator equipment, to Elliott Co., Jeanette, Pa., $98,244***turbo-generator equipment (Item 1d), to General Electric Co., Schenectady, N. Y., $4,415***surface condensing equipment, to Foster & Wheeler Co., 165 Broadway, New York, $24,112***pumps (1a), to Dayton-Dowd Co., Quincy, $5,748. Grand total $268,496. P.W.A. Noted Nov. 26, C. D.—Dec. 5, E. N.-R.

N. Y., Angola—B. Rebescher & Sons, general contractors, 110 Timon St., Buffalo, structural steel for school, for Village Bd. Educ., to Ernst Iron Wks., 75 Lathrop St.***Indiana limestone, to Hawkins & Howlett, 243 Capen Blvd., Buffalo***painting, to J. B. Barnes, 63 Woeppel St., Buffalo***plastering, to F. Seitz, 45 Avery Pl., Cheektowaga. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

N. Y., Beacon—Dpt. Correction, State Office Bldg., Albany, general contract constructing hospital at Matteawan State Hospital, to Miller & Gaynor Co., Overocker Rd., Poughkeepsie, $137,580***plumbing, to R. T. Frye Co., 11 East 44th St., New York, $34,785***elevator, to Atlantic Elevator Co., Erie Ave. and D Sts., New York, $2,458. Grand total $166,628. P.W.A. Rejected bids Jan. 16, for heating and electrical work. Noted Jan. 21, C. D.—Jan. 16, E. N.-R.

†**N. Y., Beacon**—Treas. Dpt. at office Sup. Archt., Wash., D. C., electrical work for post office, to C. P. Hansen, 230 New St., Belleville, N. J.***lathing and furring plastering, to Newark Plaster Constr. Co., 20 Elizabeth St., Newark, N. J.***cork carpet, to Louis Lichenstein, 515 Madison Ave., New York. Noted Jan. 3, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

†**N. Y., Brooklyn**—Yards & Docks, Navy Dpt., Wash., D. C., altering 1st story of storehouse at Naval Clothing Depot, Spec. 7905, to Chester Constr. Co., 341 East 30th St., New York, $11,165.

N. Y., Brooklyn—John Kennedy Co., general contractors, 41 East 42nd St., New York, 1,700 tons steel for P. S. 49, for Bd. Educ., 500 Park Ave., New York, to Bethlehem Steel Corp., Bethlehem, Pa. Noted Jan. 8, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

N. Y., Fleischmanns—J. T. Kane, general contractor, millwork for school, for Bd. Educ., Union Free School Dist. 21, Middletown, to Albany Planing & Lumber Co., Bridge St., Albany***ornamental iron, to Titchener Iron Wks., 23 Griswold Ave., Binghamton***structural steel, to Anthracite Bridge Co., Scranton, Pa. Noted Nov. 26, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

★**N. Y., New York**—New York State Marine Academy, 80 Center St., (3rd Unit), reconstructing and rebuilding fort and pier incl. renovating officers quarters at Fort Schuyler, relief labor, $800,000. Noted Jan. 3, C. D.— Jan. 9, E. N.-R.

†**N. Y., New York**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing shelters, recreation building, etc., at Ellis Island, to Albert Development Corp., 231 East 172nd St., $127,245.

†**N. Y., New York**—Treas. Dpt. at office Sup. Archt., Wash., D. C., additional heating in Parcel Post Building, to Afgo Eng. Corp., 147 Fulton St., $23,266. Bids Dec. 30. Noted Jan. 13, C. D.—Dec. 26, E. N.-R.

†**N. Y., New York**—Treas. Dpt. at office Sup. Archt., Wash., D. C., furnishing, installing special lighting fixtures for U. S. Court House, to Metalcrafts, 712 Bending Rd., Cincinnati, O., $71,849.

N. Y., Ossining—Dpt. Correction, State Office Bldg., Albany, installing electric elevator in knit shop, Sing Sing Prison, to Warsaw Elevator Co., Warsaw, $3,186. Bids Jan. 30.

N. Y, Poughkeepsie—Lower Husdon Regional Market Authority, Brewster Bldg., Newburgh, constructing 38 x 202 ft. market building with concrete floor, also administration building, gasoline station, salesroom, etc., to W. W. Kingston, 16 Cannon St. P.W.A. Bids Jan. 21. Noted Dec. 27, C. D.—May 2, E. N.-R.

N. Y., Rochester—Bd. Educ., 13 South Fitzhugh St., reinforcing steel for Grade School 49, Larrimore Rd., to Whitacre Eng. Co., Cutler Bldg., Rochester***granite, to General Stone Co., 621 Pullman Ave.***ornamental plastering, to Z. Sartini & Sons, 46 North Water St. Noted Feb. 4, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

N. Y., Rochester—Bd. Educ., 13 South Fitzhugh St., structural steel for School 4, Jefferson Terrace, to Genesee Bridge Co., 344 West Ave., Rochester; ornamental iron, to Youngs Wrought Iron Wks., 37 South Water St. P.W.A. Noted Jan. 10, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

N. Y., Rochester—Bd. Educ., structural steel for School 19, to F. L. Hughes & Co., 1029 Lyell Ave.***ornamental iron work, to Guarantee Iron Wks., 16 Railroad St.***granite and medina stone, to General Stone Co., 621 Pullman Ave. P.W.A. Noted Dec. 16, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

N. Y., Rome — Dpt. Mental Hygiene, State Office Bldg., Albany, general contract school at Rome State School, to A. E. Stephens, 11 East 44th St., New York, total est. $320,647*** plumbing, to R. T. Frye & Co., 11 East 44th St., New York***heating, to H. J. Brandles Corp., 435 Lafayette St., Utica***electrical work, to Fischback & Moore, Inc., 444 Bway., Albany. Bids for elevator rejected. Noted Jan. 21, C. D.

N. Y., Sherwood—Jenka Constr. Co., general contractors, 227 Twin Hills Dr., Syracuse, reinforcing steel for grade school, for Emily Howland Central School Dist. 4, Scipio and Ledyard, RD Route 4, Aurora, to Kalman Steel Corp. Union Bldg., Syracuse; structural steel, to Everson Bldg., Syracuse. Noted Nov. 26, C. D.— Dec. 5, E. N.-R., under "Contracts Awarded."

N. Y., Sonyea—Dpt. Mental Hygiene, State Office Bldg., Albany, painting at Craig Colony, to Ronnoco Painting Co., 76 Beaver St., New York, $4,874. Bids Jan. 8.

N. Y., Yonkers—Bd. Educ., City Hall, general contract School 26, to J. W. Ryan, 8 East 41st St., New York, about $124,000*** heating and ventilating, to J. Winkel Co., Inc., Larchmont, $18,336***plumbing, to Brown Plumbing & Heating Co., Yonkers, $6,978*** electrical work, to Palisade Electric Co., Yonkers, $8,968. Grand total $158,283. P.W.A. Bids Jan. 21. Noted Jan. 17, C. D.

†**O., Sidney**—Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office, to M. V. Loudenback, 635 North West Ave., Sidney, $48,217. Bids Jan. 30. Noted Feb. 3, C. D.—Jan. 23, E. N.-R.

Pa., Reading—E. A. Reider, general contractor 1504 Alsace Rd., about 125 tons reinforcing steel for Southwest Junior High School, to Bethlehem Steel Co., Bethlehem, for Bd. Educ. Noted Dec. 26, C. D.—Jan. 2, E. N.-R. under "Contracts Awarded."

†**R. I., Wakefield**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to New England General Contr. Co., 341 State St., New Haven, Conn., $69,995. Bids Jan. 20. Noted Feb. 3, C. D.—Jan. 16, E. N.-R.

Tenn., Memphis—City Comn., 1,500,000 bu. capacity grain elevator, to Nickolson Co., 405 Lexington Ave., New York, $264,000. P.W.A. W. B. Fowler, city engr. McDonald Eng. Co., Chicago, engrs. Noted Jan. 31, C.D.

★**Tex., Houston**—Houston Ind. School Dist., c/o H. L. Mills, bus. mgr., 1600 Washington St., 3 story, 115 x 260 ft., brick, steel, concrete high school, South West High School, to N. Wohlfield Constr. Bldg., Dallas, $679,554. 3 story, brick, rein.-con., steel East End, High

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†*Federal Government.*

Public Buildings (Continued)

School incl. classrooms, gymnasium and auditorium, to Southwestern Constr. Co., 3800 Clay Ave., Houston, $185,000. Bids Jan. 18. Noted Jan. 14, C. D.

★ **Wash., Olympia**—State, 4 story, basement office building, 19,000 sq.ft. floor space, to Sheble Constr. Co., 2019 3rd Ave., Seattle, $560,870***plumbing and heating, to General Insulation Co., Olympia, $80,534***electrical work, to Stewart Electric Co., 2400 1st St. S., Seattle, $33,785. Grand total $675,189. **P.W.A.** Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

Wis., Milwaukee—Bd. School Directors, general contractor 2 story, 78 x 150 ft. Tippecanoe School, East Hoard St., to S. M. Siesel Co., 514 East Ogden Ave., $133,880. General contractor let contract steel for school to A. F. Wagner Architectural Iron Wks., 1483 North Water St.***refrigeration, to Universal Refrigerating Co., 5402 West State St.***hardware, to P. Pritzloff Hardware Co., 333 North Plankington Ave.***plaster, to Blendel & Gregory, 2448 North 73rd St.***sheet metal to Midwest Ventilating Wks., 123 East Pittsburgh Ave***marble and blackboards, to W. Salmon Marble Co., 1536 West Pierce St.*** glass, to Patek Bros., Inc., 226 North Water St.***terrazzo, to Niedner Tile Co., 909 North Water St.***metal smoke screens, to Wauwatosa Fuel & Supply Co., 7700 Harwood Ave., Wauwatosa***acoustics, to Insulation Service Co., 432 North 27th St.*** painting, to T. Chemielewski, 6106 West Orchard St. **P.W.A.** Bids Jan. 30. Noted Feb. 5, C D.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Los Angeles—Roman Catholic Bishop of Los Angeles and San Diego, St. Paul's Parish, 615 South Figueroa St., plans by Austin & Ashley, Chamber of Commerce Bldg., church, 4112 West Washington Blvd. $175,000.

Calif., San Francisco—Roos Bros., Market and Stockton Sts., plans by Bliss & Fairweather, Balboa Bldg., and A. R. Williams, Humboldt Bank Bldg., rein.-con., steel department store additions and reconstruction. Est. $150,000 or more.

Conn., Bridgeport—St. Anthony Parish, A. A. Jalbert soon lets contract 2 story, basement, 50x80 ft. and 30x65 ft., brick and stone, steel parochial school and convent with enclosed passage, Colorado Ave. $140,000. A. De Pace, 151 West 46th St., New York, archt. Noted Feb. 7, C. D.—Feb. 13, E. N.-R.

Conn., Hartford—Caledonian Insurance Co. of Scotland, 555 Asylum St., bids during March, 2 story, 65x155 ft. and 40x45 ft. wing, brick, limestone, granite insurance office building, also penthouse, Garden and Cogswell Sts., $150,000. C. J. Malmfeldt, 36 Pearl St., archt. P. D. Bemis, 36 Pearl St., engr. Noted Jan. 9, C. D.—Jan. 16, E. N.-R.

★ **D. C., Wash.**—National Gallery of Art, c/o A. W. Mellon, Pittsburgh, Pa., sketches by John Russell Pope, 542 5th Ave, New York, art gallery. To exceed $500,000.

Fla., Lakeland—Southern College, Dr. L. M. Spivey, pres., soon takes bids for new building containing classrooms on ground floor and dormitory to be constructed in March. $150,000. Approximately all funds are on hand now.

Ill., Alton — Methodist Episcopal Bd. of Hospitals, c/o E. M. Hedger, pastor Grace Methodist Episcopal Church, plans rein.-con., stone, brick hospital, Elm Ridge. $200,000 upwards. Site and funds donated.

Mo., Kirksville — Kirksville College of Osteopathy & Surgery, G. M. Laughlin, pres., plans by Bonsack & Pearce, Inc., 411 Olive St., St. Louis, 2 story, basement, 53x90 ft., rein.-con., brick clinic building for Osteopathy College; also plans remodeling infirmary building.

Mo., St. Louis—Owner, c/o O. J. Popp, archt., 1528 Arcade Bldg., soon lets contract 2 story, basement, 50x127 ft., brick, rein.-con. store and office building, stone found., incl. freight elevator, 15th and Biddle Sts.

N. J., Budd Lake—Country Club Estates, c/o Kenneth Martin, Netcong, plans constructing group of 300 summer cabins, (log cabin type). To exceed $150,000.

N. J., Tenafly—Lylewood Hills Development Co., Knickerbocker Rd. and West Clinton Ave., plans group 2 story, brick dwellings on Lylewood Hills. $140,000.

N. Y., Brooklyn—Argent Realty Corp., 190 East 17th St., plans by Cohn Bros., 191 Joralemon St., 6 story, brick apartment, 189 East 18th St. $140,000.

N. Y., Brooklyn — Fine Homes Corp., 153 Pierrepont St., plans by Seelig & Finkelstein, 153 Pierrepont St., group 2 story, brick dwellings, 1600 70th St. $140,000.

N. Y., East Williston—Corporation, c/o Nassau County Trust Co., Mineola Blvd., Mineola, plans constructing group dwellings on 720 lots, Hillside Ave. To exceed $150,000. Architect not appointed.

N. Y., Forest Hills—Allenjoan Realty Co., Tennis Pl., plans by C. C. Rogers, c/o owner, group 2 story, brick, dwellings, Tennis Pl. near Exeter St. $140,000.

N. Y., Jackson Heights—Jacksonian Apartments, Inc., 1935 66th St., plans by Cohn Bros., 191 Joralemon St., Brooklyn, 6 story, 90x105 ft. apartment, 35th Ave. $150,000.

N. Y., Jamaica—John Mullins & Sons, Inc., 84 Myrtle Ave., Brooklyn, plans 6 story store building, Jamaica Ave. and 168th St. $250,000. Site acquired.

N. Y., Jamaica—Mrs. I. Venturini, 104-21 165th St., plans by W. Sanbur, 162-02 Jamaica Ave., group frame dwellings, Putney Rd. near Dalney Rd. $140,000.

N. Y., Jamaica—Pineford Realty Corp., 38-17 Bell Ave., Bayside, plans by J. Unger, 39-01 Main St., Flushing, constructing group frame dwellings, Surrey Rd. near Kildare Ave. $140,000.

N. Y., Lyons — First Presbyterian Church plans church. Est. about $140,000. **Maturity indefinite.** Architect not appointed.

N. Y., New York—A. H. Barbieri, 447 Bway., plans by F. Savignano, 6005 14th Ave., Brooklyn, altering heating in 6 story apartment, 47 Oak St. $40,000 with fixtures.

N. Y., New York—Samuel Barkin & Sons, 565 5th Ave., plans by J. M. Felson, 250 West 57th St., 6 story, 164x205 ft. apartment, 205th St. and Grand Concourse. To exceed $400,000. Site acquired.

N. Y., New York—Broadcort Realty Corp., 165 Bway., plans modernizing office building, 165 Bway. To exceed $200,000.

N. Y., New York—Milruth Realty Co., 2734 Jerome Ave., plans by Bates & Heinsdmann, 2526 Webster Ave., 6 story, brick apartment, 202nd St. and Grand Concourse. Est. about $140,000.

N. Y., New York—Park Central Hotel, 55th St. and 7th Ave., plans by Schultze & Weaver, 18 East 48th St., altering hotel lobby, 55th St. and 7th Ave. Est. about $140,000.

N. Y., New York—Rismar Realty Co., 110 East 42nd St., plans by I. Margon, 110 East 42nd St., constructing 6 story apartment, near 197th St. and Grand Concourse. $150,000.

N. Y., New York—Two Thousand Two Hundred Ninety-One Realty Corp., 349 East 149th St., plans by H. Ginsbern, 205 East 42nd St., 6 story apartment, Grand Concourse and 182nd St. $200,000.

N. Y., New York—Valentine Equities, Inc., 1115 East 177th St., plans by J. M. Felson, 250 West 57th St., constructing 6 story apartment, 188th St. and Valentine Ave. $150,000.

★ **N. Y., Rochester** — Rochester Telephone Corp., 502 Triangle Bldg., plans by J. Foster Warner, 130 East Main St., constructing telephone exchange and office building. $1,250,000.

N. Y., Rye—Socren Corp., 429 West 117th St., New York, plans group of dwellings and tract development, Grace Church St. $140,000 or more. Architect not appointed. Site acquired.

N. Y., Scarsdale—Corporation, c/o H. Can Buskirk, 141 Parkway Rd., Bronxville, plans constructing group brick dwellings on 50 acre site, Oak Hill Park. $140,000. Site acquired.

N. Y., St. Albans — James Newman Realty Corp., 115th Rd. and 20th St., plans by J. E. Cahill, 89-64 163rd St., group 1 story frame dwellings, 220th St. and 155th Rd. $140,000.

N. Y., St. Albans—Southern State Parkway Homes, 225th St. and Foch Blvd., plans by W. Sambur, 162-02 Jamaica Ave., Jamaica, group frame dwellings, 225th St. and 116th Ave. $140,000.

O., Cleveland—Evangelical Lutheran Hospital, L. S. Lampher supt., 2609 Franklin Ave., plans 3 story brick, steel nurses house and hospital addition, 2609 Franklin Ave., $150,000. Architect not appointed.

O., Cleveland—Great Lakes Exposition Co., Lincoln Dickey, genl. mgr., Terminal Tower, plans by A. Ceresi, 3521 West Boulevard St., constructing 3 story with towers, 400 ft. long main entrance building, 59th St. and Lake Erie, $150,000. Noted Jan. 16, C. D. — Jan. 23, E. N.-R.

O., Cleveland—St. Johns Greek Catholic Church, Eugene Tobakovich, pastor, 2779 Ambler Rd., plans by F. A. Katonka, 11408 Continental Ave., 2 story, basement, 40x115 ft. community center, 9560 Buckeye Rd. $150,000.

Ore., Portland—J. Schafer, Portland, plans 6 story, rein.-con. apartment, North 22nd St. and Northeast Davis Ave. $215,000.

Pa., Lancaster—Franklin and Marshall College, Administration Bldg., College Campus, plans by W. H. Lee, 1505 Race St., Phila., library. $150,000. Engineer not appointed.

Pa., Phila.—Sam S. Snellenburg Estate, c/o H. L. Green Co., lessee, 1009 Market St., plans department store, 10th and Market Sts. Est. $250,000.

R. I., Warwick—A. J. Murphy, archt., 25 Fenner St., Providence, soon lets contract 2 story, basement, brick, steel, stone church, concrete found., Fair St., for St. Peter's Parish, P. W. McHugh, 112 Fair St., pastor. To exceed $105,000.

S. C., Columbia — L. S. Barringer, Hotel Columbia, plans by Lafaye & Lafaye, 1226 Sumter St., 12 story, brick addition to hotel, Gervis St. $150,000.

★ **Tenn., Chattanooga**—Rose Davis Co., 705 Georgia Ave., plans by R. H. Hunt & Co., archt., Chattanooga Bank Bldg., 10 story basement, penthouse apartment on McCallie St. $1,000,000. $800,000 is being obtained from Federal Housing Administration.

Tenn., Memphis—Mid-South Cotton [illegible] Assn., Falls Bldg., C. C. Henry, [illegible] plans by W. C. Jones, Sr., & W. C. [illegible] Jr. Shrine Bldg., 3 story, 76.85 ft. x 78.4 [illegible] story steel office, incl. elevators and air conditioning, South Front and Monroe Sts.

B. C., Vancouver—Hastings Land [illegible] Ltd. plans housing development, $250,000.

B. C., Victoria—Atlas Theater Co. [illegible] plans constructing theater.

Que., Montreal—Roman Catholic Parish of St. Anastasia, plans by J. E. Perron, [illegible]58 St. Hubert St., constructing church.

BIDS ASKED

D. C., Wash.—See "Contracts Awarded."

Mass., Brockton — Allen, Collens & Willis, archts., 75 Newbury St., Boston, taking bids 1 story, basement, 50x125 ft., rein.-con. stone steel synagogue, for Temple Israel, c/o architects. To exceed $105,000. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

Mass., Needham—See "Contracts Awarded."

N. Y., Flushing—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

Tex., Dallas—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Long Beach—I. E. Loveless, archt., 102 South Robertson Blvd., Beverly Hills, 4 story, 126x147 ft., main hospital building, incl. offices, pharmacy, laboratory, dining rooms, kitchen and surgical foyer, etc. and 30x51 ft. laundry, 10th St. and Linden Ave., to C. J. Kubach-Snyder Co., 2225 East 37th St., Los Angeles, for Sisters of Incarnate Word, 1000 Linden Ave. $255,000. Noted Dec. 23, C. D.

Calif., Santa Cruz—Pacific Amusement Co., 25 Taylor St., San Francisco, rein.-con. theatre, 1,500 seating capacity, Pacific Ave., to Sahl Bros., 25 Taylor St., San Francisco, $150,000. L. H. Nishkian, 525 Market St., San Francisco, archt.

Colo., Colorado Springs — Myron Stratton Home, W. Lloyd, pres. of trustees, overhauling heating system of entire place to Jardin & Knight, Colorado Surings. Est. $27,000. Owner will also soon purchase generator for supplying electricity for institution to be operated by surplus steam from boilers used to heat buildings, $13,000.

Conn., Stamford—See "Proposed Work."

D. C., Wash.—Charles Shapiro, 1508 K St. N.W. constructing group five 3 story apartments vicinity of 5900 13th St. by separate contracts, $150,000.

Md., Baltimore — Franklin Square Hospital, Calhoun and Fayette Sts., constructing new hospital building, to Engineering & Contracting Co., North and Linden Sts., $158,450. P.W.A. Bids Jan. 31. Noted Feb. 10, C. D.—Jan. 30 E. N.-R.

Mass., Needham—Community Home Builders Inc., P. C. DiLuca, 1 State St., Boston, one hundred 2 story, basement, brick and frame residences, separate contracts. To exceed $140,000. Work started on 5 residences, F. H. Gowing, 101 Tremont St., Boston, archt.

Mass., Salem—Lawson W. Oakes, Inc., general contractors, 100 Halleck St., Boston, electrical work for office, Crombie and Norman Sts., to Lord Electric Co., 303 Columbus Ave., Boston, for Holyoke Mutual Fire Insurance Co., 114 Washington St.***plumbing, to Buerkel & Co., Inc., 24 Union St., Boston***heating, to P. A. Dolan Co., 237 Broadway, Boston*** waterproofing, to Western Waterproofing Co., Inc., 82 West Dedham St., Boston***insulation, to Spryo Flake Co., 130 Granite St., Quincy ***reinforcing steel, to J. T. Ryerson & Son, Inc., Third St., Cambridge***miscellaneous iron, to Norfolk Iron Co., 33 Newport Ave., Quincy ***limestone, to Heltonville Li'este Co., Bedford, painting, to H. Newton Marshall Co., 522 Harrison St., Roxbury***elevator, to Salem Elevator Wks., 76 Lafayette St., Salem*** marble, tile and terrazzo, to Galassi Mosaic & Tile Co., 11 Bennett St., Roxbury***erecting steel, to O. H. Horovitz, 31 Montrose St., Newton***steel windows, to H. A. Seeley Co., 38 Chauncy St., Boston***bronze doors, to Dahlstrom Metal Co., and H. A. Seeley Co., 38 Chauncy St., Boston***cast stone, to Emerson & Norris Co., 163 North Beacon St., Allston ***granite, to Alexander Thomson, Inc., 36 Albany St., Cambridge. Noted Jan. 7, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Mo., St. Louis—Hussman-Ligonier Co., 2401 North Leffingwell St., general contract 2 story, basement, 50x115 ft., rein.-con., brick office building, 2415 North Leffingwell Ave., to Morrison Constr. Co., 310 International Office Bldg., O. W. Stiegemeyer, 4817 Oleatha Ave., archt.

N. Y., Bellrose—Bellrose Housing Corp., 163-18 Jamaica Ave., constructing group 2 story, framed dwellings, 87th Dr. and 249th Sts., separate contracts now being awarded. $140,000. F. J. Burmeister, 155-31 Jamaica Ave., Jamaica, archt. Noted Jan. 20, C.D.—Jan. 23, E.N.-R.

N. Y., Elmira—J. E. Sullivan Estate, Elmira, general contract constructing store, to Mitchell Bros., 816 Walnut St., Elmira. Est. $150,000. Bids about Feb. 18, for plumbing, heating and electrical work.

†*Federal Government*

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Commercial Buildings (Continued)

N. Y., Flushing—Bobrose Development Corp., 190-05 Crocheron Ave., constructing group 2 story, frame dwellings, 169th St. and 24th Rd., day labor and separate contracts. $140,000. Private plans. Noted Jan. 13, C. D.—Jan. 16, E. N.-R.

N. Y., Laurelton—English Cottage Homes, 145-47 49th St., constructing group 2 story, frame dwellings, 131st Rd. and Cross Island Blvd., separate contracts now being awarded. $140,000. A. Fahr, c/o owner, archt. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

N. Y., New York—Bank for Savings, 280 4th Ave., altering heating in apartment, 320 East 83rd St., separate contracts. $37,000. L. E. Ordwein, c/o owner, archt. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

N. Y., New York—New York Orphan Asylum, 55 Wall St., modernization of building (mechanical equipment, etc.), 265 Bway., to W. V. Kiehnle, 3666 Park Ave. Est. $60,000. Noted Jan. 17, C.D.—Jan. 23, E.N.-R.

N. Y., New York—Three Hundred Eighty Five Central Park West Corp., 385-386 Central Park West, altering heating and elevator in 9 story apartments, 385-386 Central Park West, separate contracts and day labor. $60,000. G. Miller, c/o owner, archt.

N. Y., New York—Skaler Apartments, Inc., 45 West 167th St., constructing 6 story apartment, Woodycrest Ave. and 167th St., separate contracts now being awarded. $140,000. A. B. Bates, 2526 Webster Ave., archt. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

N. Y., Springfield—A. Aragona, 109-09 Liverpool St., constructing group 1 story dwellings, separate contracts now being awarded. $140,000. J. E. Cahill, 89-54 163rd St., Jamaica, archts. Noted Jan. 20, C.D.—Jan. 23, E.N.-R.

N. Y., Syracuse—W. M. Ballard, general contractor, City Bank Bldg., reinforcing steel for mail and service building, for New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, to Concrete Steel Co., 207 James St.***glazing, to Pittsburgh Plate Glass Co., 838 Erie Blvd. West***painting, to T. C. Pround, Fruit Valley, Oswego. Noted Oct. 2, C. D.—Oct. 10, E. N.-R., under "Contracts Awarded."

N. Y., Syracuse—Byrne Constr. Co., general contractors, 411 Roberts Ave., reinforcing steel for auditorium and recreational building for St. Lucy's Roman Catholic Church, 432 Gifford St., to Bethlehem Steel Co., Inc., Union Bldg.***structural steel, to Empire Structural Sales, Inc., 445 South Warren St.***slate, to Syracuse Mantel Tile & Marble Co., 333 East Genesee St. Noted Jan. 15, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

O., Cleveland Heights—A. A. Treuhaft, 2460 Fairmount Blvd., constructing theater, Mayfield and Noble Rds., to A. M. Higley Co., 2036 East 22nd St.; structural steel, to McClintic Marshall Co., Bethlehem, Pa. Est. $150,000. Noted Oct. 2, C. D.—Oct. 10, E. N.-R.

★ **Ore., Portland**—Montgomery Ward Co., West Chicago Ave. and North Larrimore St., Chicago, Ill., constructing 9 story addition to mail order house, to Guy Atkinson Constr. Co., Porter Bldg., about $750,000. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

★ **Tex., Dallas** — Ford Motor Co., Dearborn, Mich., exhibit and fair buildings for Texas Centennial, separate contracts. To exceed $1,000,000.

Tex., Dallas—E. I. du Pont de Nemours & Co., Wilmington, Del., exhibits and fair building, separate contracts. To exceed $100,000.

Ont., Toronto—United Co. Ltd., general contractors, 276 Palmerton Ave., painting 1 story, brick, steel theater, Queen St., for Casino Theaters Co., c/o Kaplan & Sprackman, archts., 305 Dundas St. W., to David Stewart, 111 Gough Ave. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ark., Forrest City—GARAGE SHOP, etc.—St. Francis Motor Co. plans garage shop and storage unit alterations. Est. about $37,000 with equipment. Architect not appointed.

Calif., Los Angeles—PLANT, etc.—Hemphill Diesel Eng. Schools, 2121 San Fernando Rd., plans by Norstrom & Anderson, 649 South Olive St., plant and shops addition. To exceed $40,000.

Calif., San Juan Capistrano—PLANT—American Fruit Growers Assn., 1260 Maple St., Los Angeles, plans addition to storage and packing plant. $40,000. C. E. Noerenberg, 1751 Buckingham Rd., Los Angeles, archt.

Conn., East Hartford—PLANT, etc.—National Oil Corp., Riverside Dr., plans power plant, garage, office, warehouse and loading facilities and equipment, Riverside Dr. $40,000. Private plans. Three tanks awarded to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill.; dock, to John G. Holbrook & Sons, Westbrook.

Conn., Milford—SHOP, etc.—Vincent Gaetano & Sons, Post Rd., plans by P. P. Petrofsky, 955 Main St., Bridgeport. 1 story, basement, 45x100 ft., and 14 story, basement, 30x70 ft., brick, steel, concrete, stone shop for making wrought iron, aluminum and brass products, incl. showroom, Post Rd. $37,000.

†*Federal Government.*

Ga., Atlanta—BOTTLING PLANT—Owner, c/o Canada Dry Ginger Ale Co., lessee, 122 East 42nd St., New York, plans bottling plant. $150,000. Site being selected.

Ga., Atlanta—CHEMICAL PLANT—Seydel-Wooley Co., 748 Rice St., plans altering and repairing 1 story, basement, brick, steel chemical plant. Robert Co., Bona Allen Bldg., engrs.

Ill., Belvidere—GRAIN ELEVATOR—Chicago & North Western Ry., C. T. Dike, ch. engr., 400 West Madison St., Chicago, plans grain elevator. $40,000 with equipment. **Maturity indefinite.** Architect not appointed.

Ill., Bradley—METAL STAMPING PLANT—J. H. Watson Co. plans metal stamping plant. To exceed $55,000. Architect not appointed.

Ill., Chicago—STORAGE, etc.—Federal Pipe & Service Co., 900 South Campbell Ave., plans by Anderson, Probst & White, 80 East Jackson Ave., storage and plant addition. $80,000.

Ill., Chicago—PLANT—A. Finke & Sons, 2011 North Southport Ave., soon lets contract constructing plant. $100,000. Pereira & Pereira, 333 North Michigan Ave., archts.

Ill., Chicago—STORAGE, etc.—Midland Paper Co., 652 West Randolph St., plans altering and repairing storage, 652 West Randolph St. To exceed $50,000. Architect not appointed.

Ill., Chicago—STORAGE, etc.—G. F. Wright Steel & Wire Co., 22 West Austin Ave., plans altering storage, distribution and shop building, 22 West Austin Ave. $39,000 with equipment. Architect not appointed. **Maturity indefinite.**

Ill., Chicago—SHOP and STORAGE—Owner, c/o Gordon Heating & Ventilating Co., lessee, 24 Austin Ave., Chicago, plans repairing and altering shop and storage. Est. about $37,000. **Maturity indefinite.** Architect not appointed.

Ind., East Chicago—REFINERY—Sinclair Refining Co., 45 Nassau St., New York, N. Y., plans improving refinery. $100,000.

★ **Ind., Gary**—STEEL MILL—Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh, Pa., and Gary, Ind., plans normalizing unit for steel rail mill. $500,000.

Ind., Sweetser — CANNERY — Sweetser Canning Co. plans rebuilding cannery. Est. about $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

Ia., Tama—GARAGE, etc.—F. Shilanek Garage, Tama, plans constructing garage and shop. Est. about $37,000. Architect not appointed.

Ky., Louisville — STORAGE — Merchants Wholesale Grocery Co., 1121 West Main St., plans repairing and altering storage and distribution plant. $37,000 or more. Architect not appointed.

Ky., Paducah—MARKET, etc.—Owners, c/o Dumaine Produce Co., lessee, Paducah, plans 2 story, market and storage. Est. about $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

Ky., Paducah—STORAGE—Owner, c/o H. H. Produce Co., lessee, Paducah, plans 2 story storage plant. $37,000 with equipment. Architect not appointed. **Maturity indefinite.**

★ **La., Gretna** — ROOFING PLANT — Johns Mansville Products Corp., R. B. Murphy, supt. of plant, New Orleans, (1st unit), substructure for 150x800 ft. roofing plant, to George J. Glover Co., Inc., Whitney Bldg., New Orleans. Est. $600,000.

Me., Camden — MILL — Hughes Woolen Mill, Camden, plans repairing and altering mill. $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

Md., Baltimore—PLANT—Gunther Brewing Co., 211 South Conkling St., takes bids late in March, plant addition. $40,000. H. O. Osborn, 222 West Franklin St., engr.

Mich., Jackson—FACTORY—Acme Industries Co., Jackson, plans factory repairs and rebuilding. To exceed $60,000. **Maturity indefinite.** Architect not appointed.

Mich., Kalamazoo—STORAGE—General Gas Light Co., Water St., plans by M. C. Billingham, Kalamazoo, storage addition. $70,000.

Minn., Minneapolis—CANDY PLANT—Fanny Farmer Candy Shops, Inc., 7 Griffith St., plans candy manufacturing plant. $40,000 or more.

Minn., Minneapolis—PLANT—Penn O. Tex Oil Co., 753 Plymouth Bldg., plans by Larson & McLaren, 400 Roanoke Bldg., constructing plant. $37,000.

Miss., Columbus — FACTORY — Columbus Garment Co. plans 60 ft. extension to 3 story factory building and other improvements, also construction branch factory nearby town.

Mo., Kansas City — STORAGE — Longwear Paint & Varnish Co., 301 Bway., soon lets contract storage and distribution building. $45,000. C. Sloan, c/o owner, archt.

Mo., Kansas City—PLANT—Simmons Co., 230 Park Ave., New York, N. Y., plans by C. E. Keyser, Merham Bldg., altering and improving furniture plant. $60,000.

Mo., St. Louis—PLANT—Simmons-Sisler Printing Co., 208 North 17th St., acquired plant 4127 Forest Park Blvd., and plans installing two new off-set printing presses and air conditioning equipment. $65,000.

Mo., St. Louis — FACTORY — Cupples-Hesse Envelope & Lithographing Co., E. H. Harms, pres., 4173 North Kingshighway Blvd., soon lets contract constructing 2 story, 120x173 ft., rein.-con., brick factory group addition, Penrose St. west of Kingshighway. Austin Co., 1198 Arcade Bldg., St. Louis, engrs. and archts.

Mo., St. Louis — FACTORY — Doane Carton Co., Inc., 912 North Market St., soon takes bids 1 story, 60x80 ft., brick top addition to factory, 912 North Market St. Engineering Dpt., c/o R. Gaylord, Inc., 2820 South 11th St., archts.

N. J., Jersey City—PLANT—C. F. Guyon, Inc., Passaic, and 501 5th Ave., New York, plans altering former Boynton Furnace Co. plant into distribution and service building, Whiton and Pine Sts. To exceed $37,000 with equipment.

N. J., Linden—WAREHOUSE—L. F. Hirsh & Bros., 1209 East Grand St., Elizabeth, soon lets contract 1 story, 200x250 ft., brick, steel warehouse, Elizabeth Ave. The Ballinger Co., 12th and Chestnut Sts., Phila., Pa., archt.

N. J., Long Branch — PLANT — Corp. c/o Clayton & Brower, Prospect, Cleveland and Poole Aves., or c/o J. Steinbach, Jr., Long Branch, plans 500x700 ft. baking plant on Prospect, Cleveland and Poole Aves. To exceed $100,000. Site acquired.

N. J., North Bergen—FACTORY—Italo Vittori Co., 617 25th St., plans embroidery factory, 617 25th St. Est. about $37,000 with equipment. **Maturity indefinite.**

N. Y., Arcadia—ASSEMBLY PLANT—K. R. Wilson Foundry Co. plans rebuilding assembly plant, Liberty St. To exceed $100,000. Architect not appointed.

N. Y., Brooklyn—STORAGE—G. Ehret Brewery, Inc., 193 Melrose St., plans by J. P. Voulker, c/o owner, 2 story, brick, storage extension, 193 Melrose St. $37,000 with equipment.

N. Y., Brooklyn—FUEL OIL STORAGE STATION—Webber & Quinn, 73 9th St., plans by E. M. Warff, engr. and archt., c/o owner, 1 story, 145x150 ft. fuel oil storage station, 69th St. and Avenue X. $45,000.

N. Y., Brooklyn—FACTORY—Leviton Mfg. Co., 238 Greenpoint Ave., plans by G. Erda, 788 Manhattan Ave., 4 story, brick factory, 256 Greenpoint Ave. $100,000.

N. Y., Buffalo—PLANT—Eastman Machine Co., 779 Washington St., plans by H. E. Plumer & Associates, archts. and engrs., 795 Main St., improving plant. Est. about $37,000 with equipment.

N. Y., Buffalo—WAREHOUSE—F. H. Lochr, 2660 Seneca St., plans warehouse. Architect not appointed.

N. Y., Forest Hills—FACTORY—Rosemont Impvt. Corp., 295 Madison Ave., plans by Dwight James Baum, Waldo Ave. and West 244th St., 3 story, 250x400 ft. factory, Grand Central Parkway and 64th Rd. $250,000.

N. Y., Jamaica—STORAGE, etc.—New York Plumbing Specialties Co., 148-14 Liberty Ave., plans by L. Dunaucher, 147-25 Jamaica Ave., storage, service and showroom, Liberty Ave. and Guinsberg Pl. $40,000.

N. Y., Middletown—BREWERY, etc.—Middletown Brewing Co., plans by W. S. Wick, 15 King St., brewhouse and bottling plant. $150,000.

N. Y., New York—WAREHOUSE—New York State Realty & Terminal Co., 466 Lexington Ave., plans by Kolb & Miller, 31 Union Sq., 2 story, 79x103 ft. meat warehouse, 437 West 13th St. $70,000.

N. Y., New York—STORAGE, etc.—B. Winter, 67 East 59th St., plans by Miller & Goldhammer, 40 East 49th St., 2 story, 40x70 ft., brick, concrete, steel storage, showroom and loft, 716 Lexington Ave. To exceed $50,000.

N. Y., New York—STORAGE—E. Mellick, 621 MacDonough St., plans by C. H. Richter, 175 5th Ave., 5 story storage and distribution building, 196 Greenwich St. Est. about $37,000 with equipment.

N. Y., Niagara Falls — PLANT — Niagara Alkali Co., 4205 Buffalo Ave., plans altering and constructing plant addition. Jenks & Ballou, New Industrial Trust Bldg., Providence, R. I., engrs.

N. Y., Ogdensburg—GARAGE and SHOP—Standard Oil Co. of New York plans constructing garage and shop, Commerce St. Est. about $37,000. Architect not appointed.

N. Y., Tonawanda — WAREHOUSE — Tonawanda Boxboards, Inc., 155 East 44th St., New York, sketches reconstructing storage building. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

N. C., Charlotte—MILL—Johnston Mills, soon lets contract 2 story, basement, 81x163 ft. mill addition, incl. elevator tower, platforms and partitions, rein.-con., structural steel framing, brick, pipe railings, steel ladder, etc., c.i. columns, concrete floors, elevator doors, roofing, etc. $60,000. Robert & Co., Bona Bldg., Atlanta, Ga., engrs.

N. C., West Gastonia — PLANT — Corp., c/o C. E. Honeycutt, plans altering and rebuilding manufacturing plant. Est. about $40,000. Architect not appointed.

O., Bellaire—BREWERY—Matz Brewing Co., Inc., in market for machinery and equipment for brewery for installation in former Bellaire Brewing Co. plant recently acquired.

O., Bellevue — STORAGE, etc. — McCormick-Deering Implement Co. plans storage and showrooms. Est about $40,000. **Maturity indefinite.** Architect not appointed.

★ **O., Cleveland**—FACTORY—Industrial Rayon Corp., J. P. McGervey, purch. agt., West 98th St. and Walford Ave. plans being com-

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Industrial Buildings (Continued)

pleted by Christian Schwarzenberg & Gaeda Co., archt. and engrs., 1836 Euclid Ave., 2 and 3 story factory addition and boiler house, on West 98th St. and Walford Ave. $750,000.

★ **O., Cincinnati**—POWER PLANT—Columbia Eng. Corp., engrs., 4th and Plum Sts., and 61 Broadway, New York, soon takes bids installation new steam turbine generator, 2 new boilers and building alteration at West End Station and Columbia Park Station, for Union Gas & Electric Co., H. C. Blackwell, pres. (subsidiary Columbia Gas & Electric Co., 61 Bway., New York). $2,500,000. Awaiting final approval of New York office. Noted Jan. 3, C. D. —Jan. 9, E. N.-R.

★ **O., Cleveland**—PLANT—Industrial Rayon Corp., West 98th and Walford Sts., plans by Christian, Schwarzenberg & Gaede, Union Bldg., plant addition. Est. about $1,000,000.

O., East Liverpool—FACTORY—S. C. Williams Co. (mfgrs. cardboard cartoons for pottery industry) plans rebuilding modern factory building destroyed by fire. $40,000-$50,000.

O., Hamilton — POWER PLANT — Beckett Paper Co. revising plans power plant, $250,000. Bids Dec. 23 rejected. Will readvertise. Fosdick & Hilmer, Union Trust Bldg., engrs. Noted Oct. 25, C. D.—Oct. 31, E. N.-R.

O., Port Clinton—PLANT—Standard Products Co. plans addition to plant. $37,000 with equipment.

O., Trotwood—GRAIN ELEVATOR—Trotwood Farmers Exchange Co. revising plans 95 ft. and 2 story, 42x57 ft., brick, tile grain elevator. $44,000. Bids for Feb. 10 recalled. Reliance Constr. Co., Indianapolis, Ind., engrs. Noted Jan. 30, C. D.—Feb. 6, E. N.-R.

Ore., Portland — SHOP, etc. — Fields Motor Co., 107 Grand Ave., S.E., soon lets contract 2 story shop and garage addition. $37,000 or more.

Pa., Meadville—PLANT—Ballinger Co., engrs., Meadville and 105 South 12th St., Phila., soon lets contract addition to plant, for Viscose Co., Meadville.

Pa., Uniontown—PLANT—Dudley Electric & Machine Co., East Main St., plans plant, to exceed $40,000. **Maturity indefinite.** Architect not appointed.

Tex., Corpus Christi—PLANT—Pacific-American Canneries, 111 Sutter St., San Francisco, Calif., plans building and equipping brick, rein.-con. sea food cannery plant, plain found. Private plans.

Vt., Eden—MILL—Vermont Production Co., Eden and Ruberoid Co., 500 5th Ave., New York, plan additions to asbestos mill and improvements to mines on Belvidere Mountain, Lamoille Co. To exceed $100,000.

Va., Suffolk—TEXTILE MILL—Corporation, c/o Chamber of Commerce, or c/o Century Ribbon Mills, 80 Madison Ave., New York, plans constructing textile mill. $40,000 or more. **Maturity indefinite.**

Wash., Walla Walla—CANNERY—Libby, McNeill & Libby plans 2 new buildings to double capacity of pea cannery. $125,000. E. Geart, Pacific Coast supt. **Maturity in spring.** Noted Feb. 20, C. D.—Feb. 28, E. N.-R.

W. Va., Madison—SHOP—Riverside Garage, c/o Elwood Priestly, plans shop, garage and service station. $37,000 with equipment. **Maturity indefinite.**

Wis., Milwaukee—TERMINAL—Pfister-Vogel Co., 647 West Virginia St., plans by F. F. Drolshagen, 647 West Virginia St., 1 story, 169x210 ft., brick, steel, sheet metal terminal shed, concrete found.

Alta., Edmonton—SALT DEPOSIT DEVELOPMENT—Alberta Salt Ltd., J. Gillespie, pres., plans extensive developments of salt deposits.

Alta., MacMurray — PLANT — Industrial Minerals Ltd., F. I. Batchelor, pres., Cornwall, Ont., plans salt plant of 100 tons daily capacity, on 6,800 acre site accorded by Provincial Government.

Man., Winnipeg—GRAIN ELEVATOR—Canada Malting Co., 1701 Royal Bank Bldg., Toronto and Grain Exchange Bldg., bids in March constructing 400,000 bu. concrete storage elevator, plain found., William and McPhillips Sts. $140,000. C. D. Howe Co. Ltd., 712 Public Utilities Bldg., Port Arthur, Ont., engrs.

Man., Winnipeg — PLANT — Canada Malting Co., 544 Grain Exchange Bldg., plans by Carter Halls Aldinger Co., Royal Bank Bldg., constructing 400,000 bu. storage annex to plant, William and McPhillips Sts.

N. B. Milltown — PLANT — Excelsior Co. of Canada Ltd., E. R. Mellenger, pres., St. John, plans constructing wood product plant, $40,000.

Ont., Greenwood—MILL—Fred L. Green interested in complete equipment in connection with rebuilding flour mill destroyed by fire. $40,000 loss.

★ **Ont., Hamilton**—FACTORY WAREHOUSE—Firestone Tire & Rubber Co. of Canada Ltd., Beach Rd., plans factory warehouse, Beach Rd. $500,000. Engineer and architect not appointed.

Ont., Kapuskasing—PLANT—General Refractory Products Ltd., Toronto, soon takes bids constructing processing plant for clay and silica sand deposits. Noted Apr. 4, C. D.—Apr. 11, E. N.-R.

Ont., Leamington—PLANT—H. J. Heinz Co. making plans addition at this plant to include a power house. $200,000 with equipment. C. A. Hahn, ch. engr.

★ **Ont., Toronto** — SOAP FACTORY — Lever Bros. Ltd., 299 Eastern Ave., making plans 3 story, basement addition to factory, Eastern Ave. $1,000,000. Private plans.

Que., Montreal — PLANT — Salmon River Lumber & Power Co. Ltd. plans constructing plant. $50,000.

Que., St. Johns—FACTORY—J. B. Martin Co. Ltd. plans by I. H. Lorden, factory. $50,000.

BIDS ASKED

Calif., Winters—PACKING PLANT—Dragon & Schmids, 3016 Telegraph Ave., Oakland, taking bids part 1 and 2 story, 60x250 ft., rein.-con. packing plant, for Winters Dried Fruit Co., Winters. Noted Aug. 23, C. D.—Aug. 29, E. N.-R.

Conn., Bridgeport—FACTORY—Braunworth & Co., 60 Main St., taking bids 1 story, 87x11 ft., rein.-con., stone, brick factory addition, heating, sprinkler, plumbing and electrical work, plain found. Main St. $40,000. Fletcher-Thompson Inc., 1336 Fairfield Ave., archts.

Ind., Anderson—PLANT—Howe Fire Apparatus Co., B. Howe, pres., taking bids constructing and equipping 2 new buildings for plant, 20,000 sq.ft. floor space, Ames and Crystal Sts., North Anderson, $37,000 or more with equipment.

Md., Baltimore — WAREHOUSE — National Fruit Products Co., Winchester, Va., taking bids 3 story, 50x50 ft. warehouse addition.

N. Y., Brooklyn—FACTORY—See "Contracts Awarded."

N. Y., New York—FACTORY, etc.—See "Contracts Awarded."

O., Cleveland—FACTORY—McKinney Tool & Mfg. Co., 1688 Arabelle Rd., taking bids, 1 and 2 story, 80x100 ft. brick, steel factory addition, 1688 Arabelle Rd. $40,000. E. G. Hoefler, 5005 Euclid Ave., engr.

O., East Liverpool—PLANT—B. H. Prack, archt., Federal St. N.S. Pittsburgh Pa., taking bids for 1 story, 80x100 ft. china plant addition, for Hall China Co., East Liverpool.

O., Troy—PLANT—See "Contracts Awarded."

Pa., Pittsburgh — PLANT — McCann-Shields Paint Co., 27 Alexander Ave., taking bids plant addition. $37,000 or more. C. R. Geisler, 335 Blvd., of the Allies, archt. and engr.

CONTRACTS AWARDED

Calif., Stockton — PLANT — National Ice & Cold Storage Co., 85 2nd St., San Francisco, rein.-con. cold storage unit to Lindgren & Swinerton 225 Bush St., San Francisco. $50,000 exclusive of equipment. Private plans.

Conn., East Hartford — PLANT — See "Proposed Work."

Conn., Hartford—WAREHOUSE—Pioneer Fruit & Comn. Co., 103 Connecticut Blvd., general contract 1 story, basement, 65x75 ft. and 65x105 ft., brick, steel, concrete produce warehouse, incl. cold storage facilities, Connecticut Blvd. and Kilbourne St., to Nunzio Corsino, 52 Eaton St. Est. $45,000. Noted Jan. 13, C. D.—Jan. 16, E. N.-R.

★ **Del., Edge Moor**—FACTORY—Ludlow Sales Corp., A. R. Howe, vice pres., 2100 Congress St., Boston, general contract factory, to Barclay White Co., 22 North 36th St., Phila., Pa. Est. $1,500,000. Private plans. Work started. Noted Sept. 24, C. D.—Sept. 26, E. N.-R.

Ill., Joliet—SULPHURIC PLANT—American Cyanamid & Chemical Co., 30 Rockefeller Plaza, New York, general contract sulphuric acid plant, to Chemical Constr. Corp., 30 Rockefeller Plaza, New York. Est. $250,000.

Ill., Peoria—WAREHOUSE—Hiram Walker & Sons, Inc., general contract 4 story, rein.-con. warehouse, plain found. to Val Hobst & Sons, Peoria. Est. exceeds $200,000. **P.W.A.**

La., Lake Charles—STORAGE, etc.—Continental Oil Co., 60 East 42nd St., New York, storage and distribution plant, to Darby Corp., 5534 Crestwood Ave., Kansas City, Kan. Est. $150,000. Noted Jan. 9, C.D.—Jan. 16, E.N.-R.

Mass., Cambridge — WAREHOUSE—Dewey & Almy Chemical Co., 235 Harvey St., plumbing, electrical and heating work for 2 story, basement, 50x130 ft. factory, Harvey St., by owners. Noted Dec. 18, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Minn., New Ulm—BREWERY, etc.—August Schell Brewing Co., improving brewery and bottling plant, separate contracts awarded. $37,000 or more.

Miss., Hazelhurst — MILL — Jenkins Lumber Co., planing mill and lumber plant, separate contracts awarded. $37,000 or more with equipment.

Mo., Greenfield—CONCENTRATION MILL—Dade Co. Mining Co., E. W. Nagel, in charge, constructing zinc ores concentration mill, separate contracts awarded. To exceed $37,000.

Neb., Omaha — BISCUIT FACTORY — Iten-Barmettler Biscuit Co., Omaha, general contract biscuit factory, 30th and Taylor Sts., to Parsons Constr. Co., 701 North 20th St., about $250,000. J. T. Allen, Omaha, archt.

Neb., Omaha—PLANT—Independent Bis... Co., A. D. Spier, pres. and genl. mgr., 10... Davenport St., rotary ovens for plant, to G... & Co., 202 Miley Ave., Indianapolis, Ind., $... 000. Owner will take bids in April for tra... ing ovens and complete refrigeration. To... ceed $100,000. Noted Jan. 15, C. D.—Jan. ... E. N.-R.

N. J., Elizabeth—FACTORY—F. L. Smith ... Co., North Ave., 1 story, 49x176 ft. steel, co... crete factory, North and Meadow Sts., to S... warth-Hughes Co., Paterson, $90,000.

N. Y., Brooklyn — FACTORY — Allied Indu... trial Alcohol Corp., Kane and Van Brunt S... altering factory, 37 Irving St., separate c... tracts, $37,000 or more. E. M. Wharff, ... owner, archt. Noted Jan. 16, C. D.—Jan. ... E. N.-R.

N. Y., Brooklyn—FACTORY—American ... Co., 230 Park Ave., New York, altering 6 st... factory, 120 43rd St., separate contracts. $3... 000 with equipment. Elevator awarded ... Otis Elevator Co., 130 Clinton St. Noted Ja... 16, C. D.—Jan. 23, E. N.-R.

N. Y., Buffalo—MILL—International Milli... Co., 120 Childs St., structural steel for mill, ... Buffalo Structural Steel Corp., 166 Dart St... Buffalo, W. J. Childs, c/o owner, engr. Own... taking bids soon general contract, plumbing, heating and electrical work and sprinkler sy... tem. Noted Dec. 2, C.D.—Dec. 5, E.N.-R.

N. Y., New York—FACTORY, etc.—A. A. Russell, 22 William St., altering factory, show... room, 529 Bway., separate contracts, $37,000 with equipment. R. Teichman, 115 Broad St., archt. Noted Jan. 23, C.D.—Jan. 30, E.N.-R.

N. Y., New York—GARAGE—American R... insurance Co., 99 John St., altering garage, 180 Wooster St., separate contracts awarded. $8... 000 with equipment. Morris Whinston, 110 West 40th St., archt. R. Kantor, 124 West 20th St., lessee. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

N. Y., Niagara Falls—PLANT—Vanadium Corp. of America, Saunders Settlement Rd., general contract plant addition, to W. S. Johnson Building Co., 2532 Hyde Park Blvd.; structural steel, to Lackawanna Steel Constr. Corp., Walden Ave., Buffalo.

N. Y., Schenectady—PRINTING PLANT—Maqua Co., 946 Duane Ave., general contract printing plant, to J. E. Lowe & Sons, Inc., 243 State St. Est. $150,000. Noted Aug. 16, C. D. —Aug. 22, E. N.-R.

N. Y., Syracuse—PLANT—John Morrell Co., 111 North West St., general contract plant, to Dawson Bros., Union Bldg. Est. exceeds $37,000. Noted Jan. 29, C.D.—Jan. 16, E.N.-R.

N. C., Charlotte—MILL—Johnston Mills, mill addition, to Fiske-Carter Constr. Co., Greenville, S. C. About $45,000. Robert & Co., Bona Bldg., Atlanta, Ga., engrs. Noted Feb. 14, C.D. —Feb. 20, E.N.-R.

O., Troy — PLANT — Braum Bros. Packing Co., meat packing plant, day labor and separate contracts. $50,000. L. J. Zeller, Springfield, archt.

Pa., Catasaqua—MILL—General Mills, Inc., 1151 Front St., 2 story, basement, 40x150 ft., silk mill addition, brick, plain found., Front St., to Edwin Y. Kline & Son, 422 Pine St. Est. $35,000. Private plans. Awarded Feb. 6.

Pa., Clairton—RECOVERY PLANT—Carnegie Illinois Steel Co., Carnegie Bldg., Pittsburgh, hot vapor phenol recovery plant at by-products coke works, to Koppers Constr. Co., Koppers Bldg., Pittsburgh.

★ **Utah, Provo**—POWER PLANT—Utah Power & Light Co., Kearns Bldg., Salt Lake City, constructing auxiliary steam power plant on Provo River, force account and separate contracts. $1,600,000. Trucking for excavation and hauling, to B. D. Palfreyman, Springville. J. A. Hale, ch. engr. Noted Feb. 4, C.D.—Feb. 6, E.N.-R.

Wash., Hoquiam—MILL—Grays Harbor Pulp & Paper Co., 23rd and Railroad Aves., constructing mill to break logs, to Grays Harbor Constr. Co., 609 H St., $50,000. Awarded Feb. 7. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

Wash., Seattle—PLANT—Austin Co., general contractor, Rector St., New York, let contract for structural steel for plant, for Continental Can Co., Pershing Square, New York to Bethlehem Steel Co., East 3rd St., Bethlehem, Pa. Noted Jan. 30, C. D.—Feb. 6, E. N.-R.

Ont., Copper Field — PLANT — Fraser-Brace Eng. Co., general contractors, 107 Craig St., Montreal, Que., structural steel work on addition to plant for International Nickel Co., Canada Ltd., to Dominion Bridge Co., Ltd., 1135 Beaver Hall Bldg., Montreal. Noted Jan. 14, C.D.—Jan. 16, E.N.-R., under "Contracts Awarded."

†**Ont., New Toronto**—PLANT—Austin Co., general contractors, 16112 Euclid Ave., Cleveland, O., structural steel for 2-3 story, 100x300 ft. can factory, Birmingham St., for Consolidated Can Co. (Continental Can Co., 100 East 42nd St., New York), to Dominion Bridge Co., Ltd., 1139 Shaw St., Toronto; plumbing and heating, to Purdy, Mausell Ltd., 63 Albert St., Toronto. Total est. $500,000. Noted Jan. 30, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

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For official proposal advertising see Searchlight Section

†*Federal Government.*